Methods to consider in forming Instructional Theory

Source:
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Becoming a Secondary School Science Teacher
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Instructional Method	Predominate Learning Mode			Group Size			
	Visual	Auditory	Kinesthetic	Individual	Small	Medium	Large
Chalkboard	v				V	V	V
Debate		v				V (10-15)	
Demonstrations	V	v				V	V
Discussion		v			V(2-8)	V	
Educational Software				V	V (2-4)		
Field Trip	V	v	v				V
Films	V	v			V	v	V
Games			v		V	V	
Laboratory			v	V	V		
Laboratory Report	V			V	V		

Instructional Method	Predominate Learning Mode			Group Size			
	Visual	Auditory	Kinesthetic	Individual	Small	Medium	Large
Lecture		v					V
Oral Reports		v		V	V		
Problem Solving	v			V	V		
Projects			V	V	V		
Questioning		v		V	V	v	V
Reading	V			V			
Simulations	v	v			V (5-15)	v	
Tests	v		V	V	V		

Chalkboard

Purpose: To illustrate, online, or underscore ideas in written or graphic form

Skill in use chalkboard method

- Say what you are going to write before writing it. This allow the student to begin processing the information while you write and/or diagram.
- Use key words or concepts. Try to avoid extraneous material.
- Be aware of the relationship of ideas as expressed by their position and organization on the chalkboard.
- Write legibly and large enough to be easily read.
- Stand to the side of the material so the students can see the board and you can see the students.
- Erase the board before writing a new concept, idea, or diagram.

Debate

Purpose: To allow students to gain information and discuss different sides of an issue

Guidelines in debate:

- Be sure the debate topic has clear pro/con sides.
- Use teams of 3 to 4 per side of an issue.
- Set clear time limits for opening statements, rebuttals, and closing statements.
- Make it clear that there are to be no interruptions while a speaker has the floor.
- Let the “audience” vote on the outcome.
- The debate can continue over several days and involve several teams in various aspects of a topic.

Demonstrations

Purpose: to provide students the opportunity to see a phenomenon or event that they otherwise would not observe

Hints:

- Be sure students can see and hear.
- Do the demonstration before trying it in front of students.
- Take any necessary safety precautions.
- Plan your demonstration so it clearly shows the intended concepts or skills.

Discussion

Purpose: To promote an exchange of information and ideas among members of a group or class.

Suggestion:

- Think very carefully about the topic and initial questions.
- Have the student prepare for the discussion through reading, or a field or laboratory experience.
- Provide a sheet of topics and/or question that help guide the discussion.
- As a teacher you should facilitate discussion through planning, questioning, and summarizing. Avoid using the discussion method as a means of lecturing.

Educational Software

Purpose: To allow students the opportunity to review, record, model, and acquire concepts and skills.

Suggestions:

- Select software aligned with the learning task.
- Use the software as part of the planned instruction (that is, not extra credit or “rainy day” activities)

Field Trip

Purpose: To provide a learning experience that is unique and cannot be accomplished in the classroom.

Guides:

- Take the trip yourself before making the trip with students.
- Prepare the students for the trip by informing them of the objectives, activities and required behaviors, class codes, and your general expectation.
- Make sure transportation arrangements have been made and are adequate.
- Confirm any prior arrangements for admission, guides, etc. at your destination.
- Obtain permission slips from parents.
- Arrange for additional adults (teacher and/or parents) to go on the trip.

Films

Purpose: To present information in an interesting and efficient manner.

Recommendation for effective use of films:

- Preview the film before showing it to the class
- Decide where the film can best fit in the instructional sequence.
- Outline some introductory remarks.
- You may to prepare questions and distribute them to the students.
- Generally, students should not take notes during the film. Have them concentrate on watching the film.
- You may wish to identify one or two places to stop the film and have a brief discussion. This is an effective technique if not overdone.
- Conduct a discussion after the film. You can evaluate the students understanding of key concepts. Answer questions and make connections between the film and students' previous knowledge and/or future topics of study.

Games

Purpose: To give the student opportunity to learn in an enjoyable, stimulating manner.

Guides:

- Be aware of the difficulty of the game
- Consider the appropriateness of the game for your objectives.
- Provide clear rules for the game.
- Conduct pre- and post-game discussion

Laboratory

Purpose: To give students experience in the actual use of equipment and materials as they resolve problems and develop knowledge, skill, and values related to science and technology.

Guides:

- Select the laboratory that best illustrates the concepts or skills you have as objectives.
- Make any necessary changes in the physical arrangement of the room.
- Be sure materials are available and functional
- Check any equipment to be sure it works.
- Give clear, succinct directions including safety precautions

Laboratory Report

Purpose: To have student formalize their laboratory experiences and make connections between prior and present knowledge.

Recommendations:

- Provide a purpose for the report
- Outline what you expect in terms of length, format, and thoroughness
- Review the reports
- Don't use laboratory reports as busy work
- If reports are completed by groups, have all members sign the report, indicating they contributed.

Lecture

Purpose: To present a large body of information in an efficient manner.

Suggestion:

- Be sure the lecture is organized; use an outline and either distribute it before the lecture or place it on the overhead projector.
- Supplement the lecture with slides, overheads, or charts to illustrate concepts and ideas.
- Monitor students' attention and understanding
- Talk clearly and in a manner that classifies key points and facilitates note taking.

Oral Reports

Purpose: To allow students to demonstrate their understanding of a subject.

Hints:

- Coordinate topics so there is an organized sequence of presentations that are aligned with the science program objectives.
- Allow students to report on topics of interest to them, or that they have selected from a list of topics.
- In order to give structure to the reports you might organize presentations as if they were to take place at a professional scientific meeting.
- Help students with any audiovisual aids they wish to use.
- Set clear time limits for the preparations and presentation of reports.
- Ten minutes and fifteen minutes are recommended times for middle school and high school students respectively.
- Have a formal evaluation form that the students know in advance.

Problem Solving

Purpose: To give students experience in identifying and resolving a problem.

Guide:

- Identify some general problems for study and resolution.
- Have the students narrow their study of the problem.
- Have the students give their own statement of the problem.
- Provide an opportunity to brainstorm possible solution to the problem.
- Select reasonable solutions for the problem; try some of the solutions.
- Evaluate the tested solutions.
- Prepare a formal report using the protocol of professional papers.

Projects

Purpose: To give students knowledge, skills and understanding related to a unique problem.

Guide:

- Develop a list of project ideas from which they can select
- Provide written guidelines concerning the purpose and nature of the project, the final product, time limits, and any special expectations you might have.
- Provide time and assistance as the students work on their projects, particularly in locating resources and designing experiment

Questioning

Purpose : To stimulate thinking by engaging the learner

Suggestion:

- Use a variety of questions, some convergent and some divergent.
- Provide times for students to think about the answer
- Use questions that require thinking at different levels, that is recall, comprehensions, applications, analysis, synthesis, and evaluation.

Reading

Purpose: To present information that is uniform and consistent.

Guidelines:

- Use reading materials that are appropriate to the students' abilities and your program objectives.
- Assign a variety of readings (for example, textbook, science books, popular magazines, and articles or tracts of historical significance).
- Make available a variety of reading materials in the classroom

Simulations

Purpose: To increase students' abilities to apply concepts, analyze situations, solve problem, and understand different points of view.

Guidelines:

- Selection of a problem or issue of interest to the students with at least two different viewpoints.
- Be sure that key issues and concepts are included in a realistic way.
- Make the procedures clear, including expected behavior, roles to be played, time limits, and guidelines for the simulations.
- Use lifelike materials and situations.
- The conclusion of the simulation is a good time to discuss different perception of the issues, how the student felt about the issue, how the conflict was resolved, and what actions might be taken in the future.

Test

Purpose: To provide feedback to both the students and teacher about student understanding of concepts and ability to use skills.

Guidelines:

- Test what was taught
- Use laboratory test to evaluate the process skills.
- Be sure students receive feedback about their strengths and weaknesses
- Use questions and situations that require thinking and problem solving at different cognitive levels, i.e. recall, comprehension, application, analysis, synthesis, and evaluation.