

BIBLIOGRAPHY

TAGLE, RICHEAL B. March 2007. Instructional Methods Used by Secondary Science Teachers in Baguio City. Benguet State University, La Trinidad, Benguet

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ABSTRACT

The study determined the instructional methods used by 48 science teachers and the preferred instructional methods of 320 students of private and public secondary schools in Baguio City. Lecture was the most utilized instructional method in teaching science by the teachers followed by demonstration and problem solving method. The perceptions of the science teachers on the instructional methods they use vary as to their age, gender and length of service. On the other hand, the teachers' perceptions did not vary when they were grouped according to educational attainment and type of school. Lecture, laboratory, demonstration and game methods were preferred by the students in learning science. The students' perceptions on instructional methods varied when grouped as to type of school. The students did not differ in their preferences on instructional methods that best suits their learning in science, when grouped as to gender and year level. There was no significant difference between

the instructional methods utilized by the science teachers in teaching science and the preferred instructional methods of the students in learning science. The knowledge of the teachers on the subject matter was the number one factor that affected the learning of science as perceived by the students and by the teachers.



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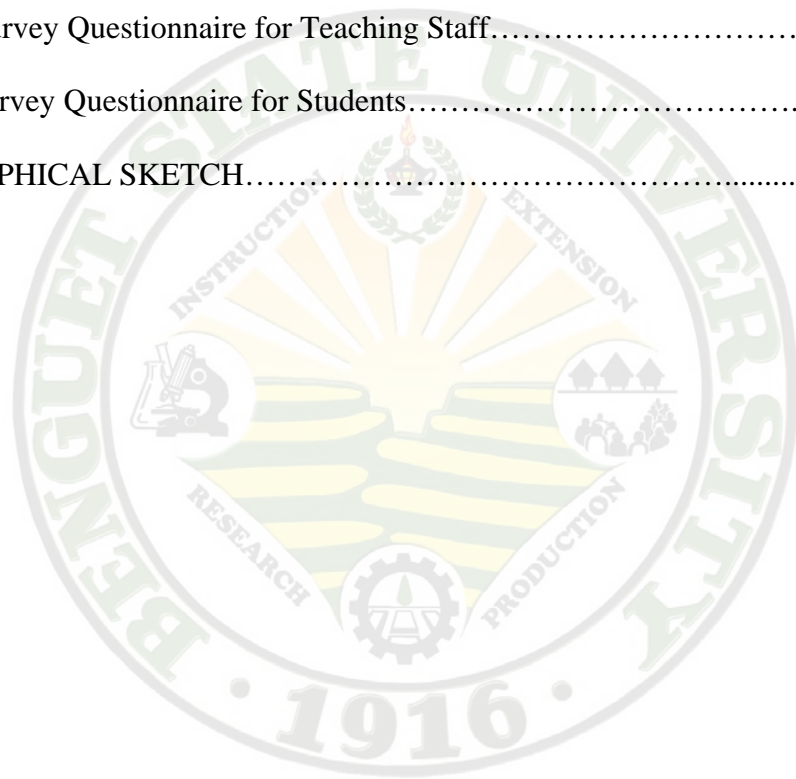
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INTRODUCTION

Background of the Study

Teaching is to be interpreted as a process of stimulating, directing and guiding the learner. The teacher must have an intensive knowledge and understanding of the physical, mental, social and emotional potentialities of those educational activities he hopes to direct and guide.

Teacher education today differs considerably from the past in which it consisted of a few courses on educational theory. Programs are much more field-oriented than ever before, requiring prospective teachers to spend more time on-site working with students in school. The present emphasis on practical experience with students should not be interpreted as a movement away from theory. Rather, educational theory is being integrated with practice. This integration recognizes that theory, to be internalized, must be learned in the context in which it is being applied. Science is one of the fundamental learning areas wherein a person must greatly involve himself. It is empirical that every individual must equip himself with the necessary concepts and skills in Science. In everyday living, one uses Science, whether one is aware of it or not.

Each school day, millions of parents entrust their most precious possessions to the care and influence of teachers. It should come as no surprise that what teachers do and how they do it are subjects of great interest and potentially intense controversy. Undeniably, a teacher is a person whose primary



professional or occupational function is to help others learn and develop new ways because students are passive learners and that their minds are like blank slates to be filled up with bits of knowledge and information.

Apparently, teachers are now struggling with students who are difficult to teach, where no one version of teaching strategy is likely to be most effective with all of them. The wide number of variables on which these students differ interacts with the strategies teachers use to teach them.

There is a need to build a repertoire of teaching strategies from which the teacher could select one that fits the learning situations. It is then the aim of this research to find out the effects of different instructional methods used by science teachers in secondary schools in Baguio City.

Statement of the Problem

The study sought to find answers to the following questions:

1. What is the frequency of use of instructional methods used by Science teachers in Baguio City?
2. Are there significant differences on the frequency of use of instructional methods in teaching Science when compared according to teachers':
 - a) age
 - b) gender
 - c) highest educational attainment
 - d) number of years in teaching



- e) type of school currently teaching
3. What instructional methods do the students prefer in learning Science?
 4. Are there significant differences on the preferred instructional methods of the students in learning Science according to:
 - a. gender
 - b. year level
 - c. type of school currently enrolled
 5. Are there significant differences between the instructional methods utilized by the teachers and the preferred instructional methods of students?
 6. What factors are perceived by the students and teachers that affect the learning of Science?

Objectives of the Study

The general objective of the study is to find out the effects of teachers' teaching strategies to students in both public and private secondary schools in Baguio City. More specifically, the study aimed to:

1. Determine the frequency of teachers use on the identified instructional methods in teaching Science.
2. Determine the significant differences on the frequency of use of the methods used in teaching Science when compared according to teachers':
 - a. age
 - b. gender



- c. highest educational attainment
 - d. number of years in teaching
 - e. type of school currently teaching
3. Identify the different instructional methods preferred by the students in learning Science.
4. Determine the significant differences on the preferred instructional methods of the students according to:
 - a. gender
 - b. year level
 - c. type of school currently enrolled
5. Determine the significant differences between the instructional methods utilized by the teachers and the preferred instructional methods of students.
6. Identify the different factors perceived by the students and teachers that affect the learning of Science.

Importance of the Study

Teaching is a systematic presentation of facts, ideas, skills, and techniques to students. Although human beings have survived and evolved as a species partly because of a capacity to share knowledge, teaching as a profession did not emerge until recently. The societies of the ancient world that made substantial advances in



knowledge and government, however, were those in which specially designated people, assumed responsibility for educating the young.

Teaching and learning supplement and complement each other. Teaching is something that takes place only when learning does. Both are important in the educative process. The concept of teaching must not be sacrificed to the concept of learning nor the other way around. From the nature of this relationship, the systematic transmission of knowledge and values from teacher to learner needs to proceed smoothly.

This study is then important in providing insights and facts about instructional methods as potent variables affecting science teaching in secondary schools in Baguio City.

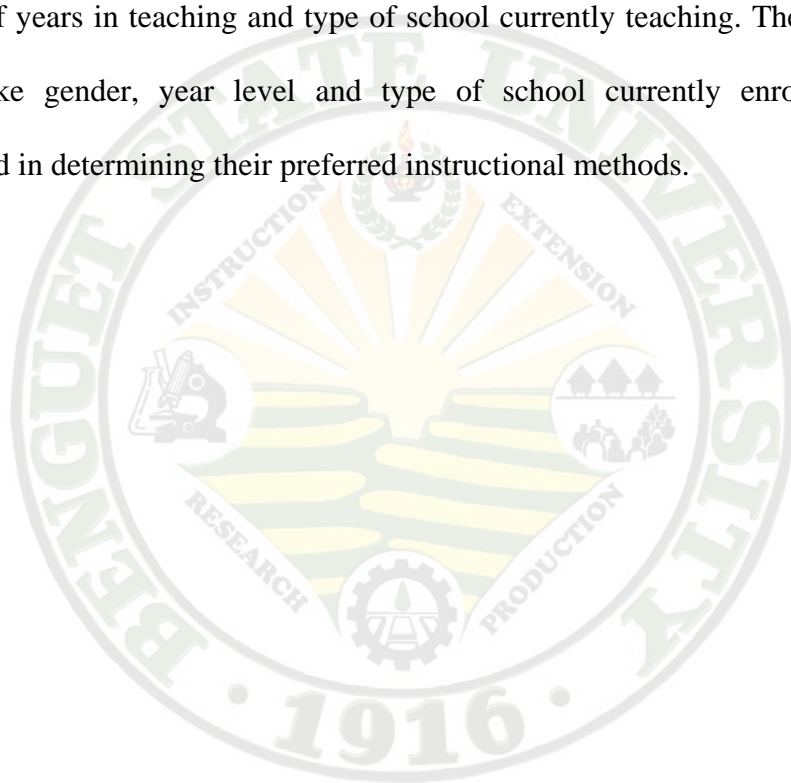
On the bases of the findings of this study, concerned school administrators, faculty members, guidance counselors and other school officials may be provided with relevant feedback to guide them to re-focus their strategies and programs towards the improvement of instruction with the end in view of improving students' academic performance, personal and social development.

Ultimately, the findings of the study are directed toward the opening of new frontiers of knowledge, which were not provided by previous researches and the discovery of facts essential in theory building.



Scope and Delimitation of the Study

This study aimed to identify the different instructional methods used by science teachers in both public and private secondary schools in Baguio City during the school year 2006-2007. In dealing with this study, the researcher considered the teachers' profile like age, gender, highest educational attainment, number of years in teaching and type of school currently teaching. The students' profile like gender, year level and type of school currently enrolled were considered in determining their preferred instructional methods.



REVIEW OF RELATED LITERATURE

This chapter summarizes some research studies and literature which pertains to the main aspects which are studied in this research.

Teacher's profile

The teaching profession varies from country to country. In many countries, teaching is a highly respected and prestigious profession. All countries, particularly developing nations, lose many of their most qualified teachers to more lucrative positions in commerce and industry.

The 1996 report of the Department of Education's National Commission on Teaching and America's Future presented a clear program for change in teacher education. This report cited several barriers in improving teaching in the United States, such as inadequate teacher education programs; poor teacher recruitment efforts, particularly in such subjects as mathematics and science; poor administrative practices that typically saddle new teachers with the most challenging and demanding tasks; and lack of rewards for teachers who demonstrate outstanding skills and performance. To overcome these problems, the commission challenged the nation to accomplish six goals by the year 2006: (1) for all children to be taught by teachers who have the knowledge, skills, and commitment to teach children well; (2) for all teacher education programs to meet national professional standards, or else be closed; (3) for all teachers to have access to high-quality professional development; (4) for teachers and principals to



be hired and retained based on their ability to meet professional standards of practice; (5) for teachers' salaries to be based on their knowledge and skills; and (6) for high-quality teaching to be the central investment of schools, with most educational funding directed toward classroom instruction. To achieve these goals, the commission made specific recommendations. For example, it recommended that funding be made available to expand the work of the National Board for Professional Teaching Standards (NBPTS). Founded in the late 1980s, the NBPTS specifies levels of competency and expertise for teachers. Experienced teachers can become certified by the NBPTS only after passing a screening based on both their knowledge of academic subjects and their performance with children. This certification has afforded teachers recognition as professionals and, in many cases, has enabled them to command higher salaries. It also has helped to establish national standards for quality teaching.

On the other hand, the chronological age maturity of an individual is said to be affecting the effectiveness of strategic teaching. Psychology had it that mental age in relation to the chronological age of an individual plays an important role in the teaching learning process. It is then important to consider one's intelligence or ability for it helps in the greater realization of the instructional method used.

According to Angel (1993), females excel in language arts, spelling and penmanship. They are more creative and have more initiative to look for ways and



means to execute strategies effectively. Thus, saying that female teachers are more effective in handling strategic instructions than males. Long term experience has something to do with the improvement of teaching strategies. Teachers who had acquired many experiences will likely to discover new techniques and styles of teaching.

Educational attainment of a teacher plays an important role in the attainment of science teaching not only in science but in any subject. The higher the degree earned, the more the individual is expected to have varied strategies and techniques in teaching science to varied students. They may have to come up with methods that suit the students' learning styles.

Student's profile

There is no doubt that people vary widely in many ways, such as their abilities to use words, to solve arithmetic problems and perceive and remember spatial information. Some investigators have suggested that certain intellectual abilities are completely independent of one another. And from their different abilities, their interests grow.

Many psychologists believe that there are gender differences in verbal ability, with girls surpassing boys in most verbal tasks during the early years.

It turns out that the old consensus about gender differences is at least exaggerated and at most simply wrong. Hyde (1998) examined 165 research studies on gender differences in verbal ability; these studies had tested a total of



1.419 million people. Although Hyde found a gender difference in favor of females, it was so small that they claimed it not worth mentioning. He further argued that more refined tests and theories of intelligence are needed to examine any gender difference that may exist. Boys are motivated to achieve more and strive harder at math, in part because more of them have career aspirations that involve mathematical skills. As a consequence of these aspirations, boys tend to take additional courses particularly advanced math courses. Jaddin (1999) emphasized that these aspirations have biases in cultural expectation. In general, it is fair to say that the difference between the tests scores of males and those females are disappearing and that this change has been occurring in many cultures, according to Slevenson (1994).

Balictan (1995) concluded that there is a significant difference between the performance of males and females. The most apparent difference among people are age and sex. Thus, it is not surprising that a great deal of research has been conducted on the extent to which intellectual abilities vary with increasing age and between males and females. Of course, this issue is highly relevant socially. It is obvious that our intellectual reasoning increases as we grow older, at least until early childhood. Grusec as cited in the book of Sergio (2001), recognized this fact in constructing his test that mental age increases with chronological age, but theorized that IQ remains stable as a constant reflection of individuals' intellectual abilities with respect to population.



Teaching Method

Teaching is something that takes place when learning does. No matter what the teacher is doing in his class if the students are not learning something significant, the teacher is not teaching as stated by Aquino (1988).

Similarly, Odiem (1999) pointed out Dewey's idea that, teaching and learning are correlated activities, that when a child has not learned anything it is because the teacher has not taught. The teacher should be concerned with the learner and promoting learners and guiding the learner's development with teaching methods.

On the other hand, Arrends (1994) says that common teaching methods are lecture method, the guided discussion method, and the demonstration-performance method. A discussion on cooperative or group learning also is included since this type of learning may be useful in conjunction with either the lecture or guided discussion methods. A teaching method is seldom used by itself. In a typical lesson, an effective instructor normally uses more than one method. For example, a demonstration is usually accompanied by a thorough explanation, which is essentially a lecture.

Regardless of the teaching method used, Duke (1999) specifies that an instructor must properly organize the material. The lessons do not stand alone within a course of training. There must be a plan of action to lead instructors and their students through the course in a logical manner toward the desired goal. In



all cases, a systematic plan of action requires the use of an appropriate training syllabus. Generally, the syllabus must contain a description of each lesson, including objectives and completion standards. Some schools and independent instructors may develop their own syllabus for use in their aviation training program. Thus, Joyce (1992) says in his book that the main concern of the instructor usually is the more manageable task of organizing a block of training with integrated lesson plans. The traditional ways of organizing a lesson plan according to Hansen (1997) are introduction, development, and conclusion. The introduction sets the stage for everything to come. Efforts in this area pay great dividends in terms of quality of instruction. In brief, the introduction is made up of three elements- attention, motivation, and an overview of what is to be covered. The purpose of the attention element is to focus each student's attention on the lesson. The instructor may begin by telling a story, making an unexpected or surprising statement, asking a question, or telling a joke. Any of these may be appropriate at one time or another. Regardless of which is used, it should relate to the subject and establish a background for developing the learning outcomes. The purpose of the motivation element is to offer the students specific reasons why the lesson content is important to know, understand, apply, or perform. This motivation should appeal to each student personally and engender a desire to learn the material. Every lesson introduction should contain an overview that tells the group what is to be covered during the period. A clear, concise presentation of the



objective and the key ideas gives the students a road map of the route to be followed. A good visual aid can help the instructor show the students the path that they are to travel.

Morsen (1995) added that development is the main part of the lesson. Here, the instructor develops the subject matter in a manner that helps the students achieve the desired learning outcomes. The instructors logically organize the material to show the relationships of the main points. The instructor usually shows these primary relationships by developing the main points in one of the following ways: from past to present, simple to complex, and known to unknown. In past to present pattern of development, the subject matter is arranged chronologically, from the present to the past or from the past to the present. Time relationships are most suitable when history is an important consideration. The simple-to-complex pattern helps the instructor lead the student from simple facts or ideas to an understanding of involved phenomena or concepts. In some subjects, certain information or concepts are common to all who use the material. Under each main point in a lesson, the subordinate points should lead naturally from one to the other. With this arrangement, each point leads logically into, and serves as a reminder of the next. Meaningful transitions from one main point to another keep the students oriented, aware of where they have been, and where they are going. This permits effective sorting or categorizing chunks of information in the working of short-term memory. Organizing a lesson so the



students will grasp the logical relationships of ideas is not an easy task, but it is necessary if the students are to learn and remember what they have learned. Poorly organized information is of little or no value to the student because it cannot be readily understood or remembered.

An effective conclusion retraces the important elements of the lesson and relates them to the objective. This review and wrap-up of ideas reinforces student learning and improves the retention of what has been learned. By organizing the lesson material into a logical format, the instructor has maximized the opportunity for students to retain the desired information. Each teaching situation is unique. The setting and purpose of the lesson will determine which teaching method, lecture, guided discussion, demonstration performance, cooperative or group learning, computer- based training, or a combination- is used as stated by Johnson (1991). In addition, Vito (1993) emphasized on how teachers operate or how they call their teaching method. What matters is that, teachers create a learning environment that will recognize and respond to individual needs and differences.

Teaching Science

According to Montgomery (2002), it is a common place observation that people with little formal schooling are often quite adept at finding practical "hands on" solutions to the problems of everyday life. In the rich countries, the educated lives and consumes in an artificial environment of technologies, too complex to be understood, much less controlled, by individuals. For most,



experience with natural phenomenon and basic technical systems is very limited.

Thus, Butzow (2000) states that it is not at all surprising that, those relatively unschooled villagers in developing countries often demonstrate technical inventiveness and environmental understanding which astonish rich visitors. Farmers, for example, make complex decisions about which crops to plant and when, based on their knowledge of the soil and ecological interactions. Most village-level technical innovation comes from trial and error and observations, often over many seasons. Village technology evolves as a result. But unsupported by systematic knowledge of natural science, the rate of village technology development is much slower than it could be.

Unfortunately, Reynolds (1996) observed that the science taught in schools in developing countries does not contribute to useful innovations in village technologies. Science studies should equip students on how to apply the basic principles and scientific laws of physics and biology to address a common problem. Related skills on how to systematically control and vary a set of experimental trials, and how to carefully observe and record the results are equally important. But educational methods and curricula that are based on repetition and memorization, or inherited from a colonial past, usually mean that science teaching in the South concentrates on phenomena that are beyond the students' everyday experience, with little or no practical value.



Keane (2000) says that Science education (and education in general) is, in fact, too often part of a sorting process through which a fortunate few may escape the rural areas and qualify for an urban job in government. Science teachers themselves, the products of such a system, do not expect the community to demand that they teach a practical curriculum relevant to local conditions. These teachers are, in any case, ill-equipped to do so; in most cases science is simply one of a number of subjects the teacher is covering each day. As the science material taught is abstract and has little to do with local conditions, so it is natural that science teaching equipment for demonstrations is composed of what is by local standards expensive and exotic apparatus. The lucky teacher who succeeds in obtaining such apparatus from the education ministry is faced with two alternatives: to use it to demonstrate what are likely to be seen as peculiar and rather magical events, more a property of the equipment than the real world, or lock it away in a closet to prevent damage to something so valuable. In either case it is rarely (if ever) used by the students themselves, who never get a chance to get excited about science and carry out their own simple experiments.

On the other hand, Science teaching as cited in the book of Trowbridge (1990) should facilitate students' learning about Science and Technology as they need to understand and use them in their personal lives and as future citizens. Science teaching should sustain students' natural curiosity; develop their skills and use technology, contribute to their understanding of the role limits and



possibilities of Science and Technology in society and inform the choices they must make in their personal and social lives.

Teaching Science is fundamental to effective schooling. From the studies of the Institute for Research on Teaching (1996), there is a picture of effective teachers as semi autonomous professionals who are clear about their instructional goals, knowledgeable about lesson content and strategies of teaching, can communicate to their students what is expected and why, can make expert use of existing instructional materials in order to devote more time to practices that enrich and clarify lesson content, can teach students metacognitive strategies and give them opportunities to master them, can address higher as well as lower level of cognitive objectives, can monitor students understanding by offering regular and appropriate feedback, can integrate their instruction with that of the other areas, can accept responsibility for student outcomes and are thoughtful and reflective about their practice

Instructional Methods used in Science Teaching

Demonstration Method. Demonstration can be used to teach concepts or skills directly or to prepare students for work in the laboratory. Demonstrations are often used due to safety concerns or lack of equipments. The best demonstrations have a dramatic quality and usually deal with something that is puzzling to the students. Demonstrations can also be given inductively, by the instructor asking several questions but seldom giving answers. A demonstration



has an advantage of stressing inquiry which encourages students to analyze and make hypothesis based on their knowledge, Cooper (1999).

Matthews (1994) revealed that inviting students to inquire at something taxes their minds and requires them to think. Thinking is an active mental process. The only way students can learn to think is by having opportunities to do so. A demonstration provides this opportunity because students' answers to the instructors' questions act as a feedback. The teacher has a better understanding of students' comprehension of the demonstration. Banks (1995) added that the feedback acts as a guide for further questioning until the students discover the concepts and principles involved. The teacher is now sure that they know the meaning and purpose.

Lecture Method. The lecture method is the most widely used form of presentation. Lectures are used for introduction of new subjects, summarizing ideas, showing relationships between theory and practice, and reemphasizing main points.

The lecture method of teaching needs to be very flexible since it may be used in different ways, Ornstein (1992). There are several types of lectures such as the illustrated talk where the speaker relies heavily on visual aids to convey ideas to the listeners. With a briefing, the speaker presents a concise array of facts to the listeners who normally do not expect elaboration of supporting material. During a formal lecture, the speaker's purpose is to inform, to persuade, or to



entertain with little or no verbal participation by the students. When using teaching thru lecture, the instructor plans and delivers an oral presentation that allows some participation by the students and truly helps direct them toward the desired learning outcomes. The teaching thru lecture is favored by aviation instructors because it allows some active participation by the students. The instructor must determine the method to be used in developing the subject matter. The instructor also should carefully consider the class size and the depth of the presentation. As mentioned in the book of Bernardino (1999), covering a subject in too much detail is as bad as or worse than a sketchy coverage. Regardless of the method of development or depth of coverage, the success of the teaching thru lecture depends upon the instructor's ability to communicate effectively with the class. The lecture may be conducted in either a formal or an informal manner. The informal lecture includes active student participation. The primary consideration in the lecture method, as in all other teaching methods, is the achievement of desired learning outcomes. Learning is best achieved if students participate actively in a friendly, relaxed atmosphere. Therefore, the use of the informal lecture is encouraged. At the same time, it must be realized that a formal lecture is still preferred on some subjects and occasions, such as lectures introducing new subject matter.

Arrellano (1991) added that the purpose of films, video or CD-ROM is to present information in an interesting and efficient manner. Its predominant



learning modes are auditory and visual. Most students are interested in films and video. Science teachers need to use films in a manner that will attain the established objectives.

Project Method. Many science teachers like having students work on projects and participate in local and regional science fairs. The purpose of project method is to give students knowledge, skills and understanding related to unique problems.

Cooper (1999) mentioned that, science teachers should consider in giving projects a list of project ideas for students. He must provide written guidelines concerning the purpose and nature of the project, the final product, time limits and any special expectations. He should also provide time and assistance as the students work on their projects, particularly in locating resources and designing experiments.

For the younger children, project work can be thought of as the more formal part of the program involving more teacher guidance than might be found when the children are at play. However, for the older children, project work is more likely to constitute the more informal part of the program, the part where they have greater autonomy in the development of their work than when involved in teacher directed instruction. Project work and systematic instruction can be seen as providing complementary learning opportunities. Children not only need to know how to use a skill but also when to use it. They need to learn to recognize



for themselves the context in which the skill might be useful and the purposes which it can most appropriately serve. In systematic instruction, the children acquire the skills and in project work they apply those skills in meaningful contexts. The project work can be seen as the part of the curriculum which is planned in negotiation with the children and which supports and extends the more formal and teacher directed instructional elements, Keane (2000). The types of activity or task the teacher plans will be different according to which kind of learning is intended. The teacher's role is different in relation to the child at work. Where the child is acquiring skills, the teacher is more of a director whereas when children are applying skills they already have, the teacher is more of a guide. The child can also feel quite different about the activity according to which kind of learning is involved.

Laboratory/Experimental Method. Laboratory method is given to formalize their experiences and make connections between prior and present knowledge. Amorin (1996) said that Science is not really a Science unless it is accompanied by experimentation and laboratory works. In the late 1800's, laboratories were constructed in secondary schools and colleges with corresponding change in emphasis in the methods of instruction. The recitation method and catechetical method for learning science principles were gradually replaced by experiments in the laboratories with the expressed purpose of verifying the laws of Physics and Chemistry. Laboratory apparatus were



designed to duplicate as nearly as possible the materials and equipments used in the original experiments, with the modern refinements to ensure reasonable accuracy in the hands of Science students.

In addition, experimental method is usually taken to be the most scientific of all methods, the 'method of choice'. Potter (1995) stressed that the main problem with all the non-experimental methods is lack of control over the situation. The experimental method is a means of trying to overcome this problem. The experiment is sometimes described as the cornerstone of psychology: This is partly due to the central role experiments play in many of the physical sciences and also of the psychology's historical view of itself as a science. A considerable amount of psychological research uses the experimental method. An experiment is a study of cause and effect. It differs from non-experimental methods in that it involves the deliberate manipulation of one variable, while trying to keep all other variables constant.

Problem solving Method. Problem-solving means the processes involved in the solution of a problem, Reber (2001). According to the research of cognitive psychology, the thinking process involved are figuring out the solutions of anagrams, puzzle box and water-jar problems. Problem solving is the ability to solve problems. A problem is simply a request for a satisfying outcome to a situation. Solving the problem is a method of organizing the given information



and using that information, along with knowledge it possesses, to obtain the desired outcome or solution.

According to Gage (1991), there are five critical cognitive processes of problem solving. First, **Identification:** Recognizing that a problem exists. Less mature and less able learners often simply fail to see that a problem exists. Thus, they do not feel the need for a solution. Second, **Definition:** Defining problems, classifying problem types, and building representations. The method of solution greatly depends on how the problem is initially coded and defined. Usually, there is more than one way to solve a problem. Different mental representations of the problem lead to different attempts at a solution. Third, **Exploration:** Exploring strategies for a solution. This particular strategy attempt depends on how the problem was initially defined and coded. Fourth, **Action:** Acting out strategies in order to obtain the desired outcome to the problem. Fifth, **Looking and Learning:** Reflecting on the effects of our actions. More successful problem solvers revise or abandon faulty strategies. Less successful problem solvers keep on working with inadequate strategies.

Trowbridge (1990) added that problem solving is not used as often as one would expect. Basically, the method is to place the students in a situation where they must take some action that is not immediately obvious. Problem solving is closely related to the technological design and provides opportunities for students



to encounter concepts such as criteria, constraints, costs, risks, benefits and trade-offs.

Fieldtrip Method. This method can be an exciting complement to the Science program. On the contrary, this method can also be a disaster. The difference between learning experience and a disaster lies in the preparation for and appropriateness of the trip. A science teacher decides on the appropriateness, timing, destination and place of the trip in the instructional sequence. The purpose of fieldtrip is to provide a learning experience that is unique and can not be accomplished in the classroom. Fieldtrip predominant learning modes are kinesthetic, visual and auditory.

Reading Method. Reading is an activity characterized by the translation of symbols, or letters, into words and sentences that have meaning to the individual. The ultimate goal of reading is to be able to understand written material, to evaluate it, and to use it for one's needs. Reading refers to activities as varied as a first grader's struggling with simple sentences in a storybook, a cook's following directions from a cookbook, or a scholar's attempting to understand the meanings of a poem. Reading exposes people to the accumulated wisdom of human civilization. Mature readers bring to the text their experiences, abilities, and interests; the text, in turn, allows them to expand those experiences and abilities and to find new interests. To reach maturity in reading, an individual goes through



a series of stages, from readiness to adult reading ability (Microsoft Encarta 2006).

Reading is central to effective instruction, Brigham (1991) said that reading should be used in Science classes. It should not be the exclusive learning method. The reading of materials other than the textbook is encouraged. Reading materials that are appropriate to the students abilities and program objectives, and assigning of variety of readings (for example textbook, science book, popular magazines and articles or tracts of historical significance) are necessary because the purpose of reading is to present information that is uniform and consistent.

Games Method. Use of games can provide students with a variation on the usual classroom procedures. If used wisely, they can be valuable for developing concepts and ideas not generally conveyed by other methods. Science should have some guidelines in method like considering the difficulty of the game, appropriateness of the game for their objectives, providing clear rules for the game and conducting pre and post game discussion.

Debate Method. Debate is talking or arguing about something: to talk about something at length and in detail, especially as part of a formal exchange of opinion (Microsoft Encarta 2006)

Brandwein (1990) added that, debate is an effective way to introduce different sides of science-related issues. The debate continues over several days and involves several teams in various aspects of a topic. Students will have to



understand information concerning their position and develop the skills of analysis and evaluation concerning their opponent's position. Debate is an excellent method to encourage students to take a different perspective and engage in ethical discussion of issues. The soul purpose of giving a debate is to allow the students to gain information and discuss different sides of an issue and resolve conflicts. In addition, Ramigo (1991) stated that, this method requires students to synthesize everything they have learned to this point and to present a coherent, well-researched, well-supported position to classmates and the instructor. Debates may well expose differences and similarities in the arguments more clearly than written assignments can. Although formal methods are presented, debates can also be more informal, if appropriate for a particular issue. An expository debate can be created simply by asking two students to come to class prepared to discuss the issue at the next meeting. This form of debate may take no more than a few minutes and will leave one free to amplify or detract from either argument. Whether formal or informal, debates have many advantages: they force students to speak in front of their peers, they force students to adopt a point of view and defend that position--as they may well have to do in the real world, debates, with the provided text materials, are fairly well outlined and may require a minimum of student research in order to successfully defend a position, debates relieve the teacher of extensive lecture preparation and give students responsibility for generating their own learning experience, debates allow issues to move freely into



areas not necessarily covered by the text materials, debates are excellent formats for group discussion and are easily adapted to situations where teaching assistants are responsible for discussion groups outside of the standard classroom lecture and debates give students a role and structure in which to express opinions that may differ from the instructor's.

Factors affecting the learning of science.

One aspect of teaching is how effective the teacher is. The two major categories into which the characteristics of an effective teacher may be grouped are 1) professional qualities and 2) personal qualities. Professional qualities refer to the mastery of the subject matter, understanding of the learner, understanding the teaching principles and skills in the use of techniques. Personal qualities are related to the 5 aspects of personality; intellect, social, physical, emotional and moral, according to Lardizabal (1991). In her study, Lubrica (1996) found that there was academic under qualification for science teaching and that there was deficiency in teacher's training within the CAR.

Several and varied difficulties cropped up in the learning of science. The teaching of Science conducted by Molina (1971), found that inadequacy of Science equipments was the most serious problem encountered. Because of these inadequacies, teachers are suggested to make different improvised equipment and materials that are available with in the community resources.



The insufficiency of materials and other science equipment for teaching is a common problem in many government schools. Thus, there is a need to make science programs that will fit into the local setting and the need for more textbooks that are upgraded.

The ideas gathered from the related articles and studies lent valuable information in the development of the present study, from the introduction until the formulation of the detailed steps followed throughout the study.

Conceptual Framework

Science is important to everyone. The world is in desperate need of more and better science precisely because it has been one of the dominant forces in people's lives and the life of the world for several hundred years. Science and its derivative, technology, have increased the life expectancy and material well-being of people but at the same time have led the world to the brink of disaster through ecological catastrophe or nuclear war. Science raises the hope that people can truly progress to a higher understanding of others and their relationships with nature.

There are different methods/tactics in Science teaching. These methods are a combination of older and newer ideas that are useful in any educational level from kindergarten to collegiate as to: bridging and applying, using control, using analogy, using substitution, and analyzing faculty procedures.



Craig (1958) delved on methods of teaching Science and quoted an author thus:

“Of all the methods that have been proposed for the use in high schools, one method must have special consideration in the teaching of Science, the scientific method. The application of scientific method is a matter of securing the most reliable information within the easy comprehension of the students. It is evident that students do not discover new information for they are to become adequate for the world of today and tomorrow.”

There are different instructional methods in Science teaching. The role of the Science teacher is to see to it that the instructional methods used is appropriate with the objectives of the lesson and is suitable for learning. Figure 1 shows the variables in the study. Instructional methods in Science teaching are the independent variable. Frequency of using the instructional methods used by Science teachers, instructional methods preferred by the students in learning Science and factors perceived by the teachers and students that affect the learning of Science are the dependent variables. Teachers and students profile are the intervening variables.

Learning is a process of acquiring and integrating into one's personality, information, skills, habits and attitudes. Learning takes place when the whole being and the total stimulation are considered as stressed in Gestalt Theory. This simply means that the individual does not only act merely to stimulus but rather to the background and setting. A teacher, through his/her instructional methods



affects the students' initiatives and enthusiasm. Since instruction should begin at the point of interest of the student, a full knowledge of students' preferred instructional methods is required.



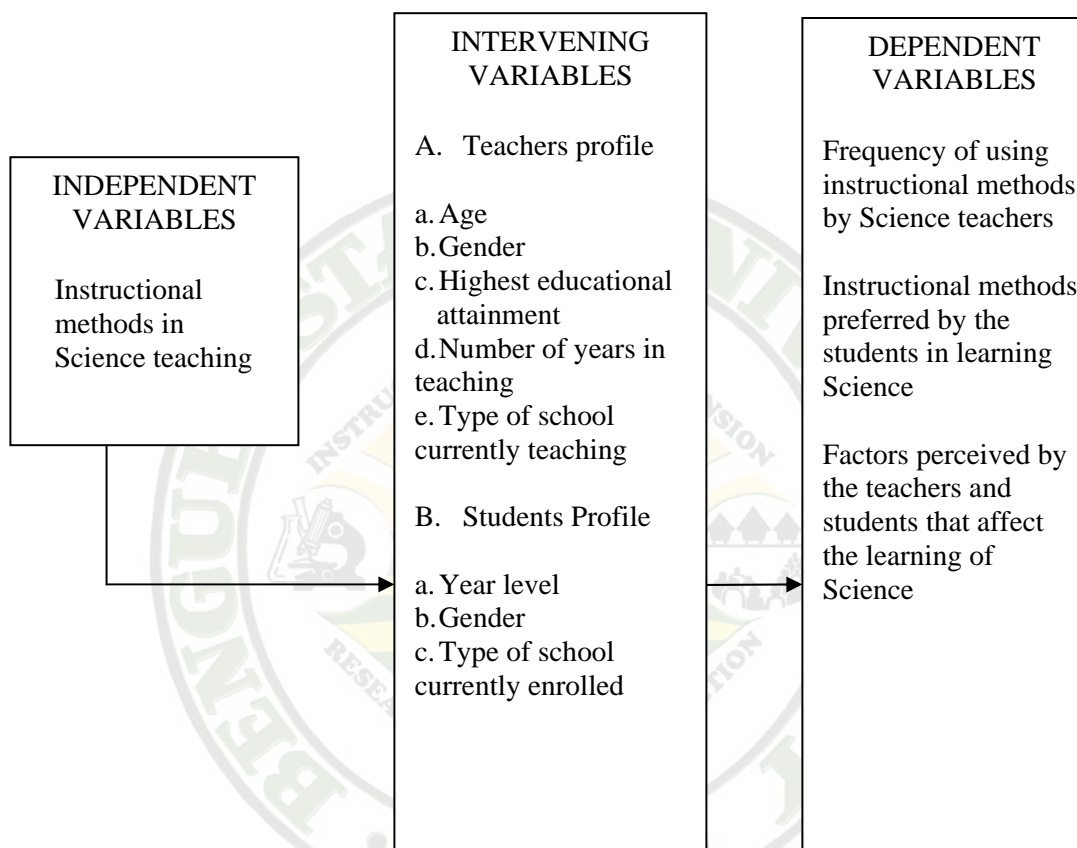


Figure 1. Paradigm of the Study



Definition of Terms

For the common and clear understanding of the study, the significant terms are hereby defined:

Age. The number of years computed from the time of birth to the last birthday categorized into the following 21-30 years old, 31-40 years old, 41-50 years old, 51 and above.

Debate Method. This methodology requires one to talk or argue about something at length and in detail, especially as part of a formal exchange of opinion.

Demonstration Method. This learning activity is performed by a student or a small group while the rest of the class observe. This activity is done for experiments involving expensive materials or dangerous chemicals.

Educational attainment. Categorized as bachelor's degree, master's or doctorate degree.

Fieldtrip Method. It is an out of classroom activity whereby, students study things in their natural settings.

Games Method. These are activities or contests governed by sets of rules. People are engaged in games for recreation and to develop mental or physical skills.

Instructional materials. It is an established way of doing anything or the means or manner by which it is presented or taught.



Instructional Method. It is an art of teaching with the use of devices and application of methods and principles in teaching in order to affect the proper development of the individual student.

Laboratory/Experimental Method. One way of teaching, that actively involves every student in the class in manipulating materials and simple equipment to find answers to questions and solve problems.

Lecture Method. It is a teaching procedure for clarifying or explaining a major idea cast in the form of a question or a problem. This type can be dominated by the teacher, can be a discussion between the class and the teacher, and can be accompanied by visual materials such as slides, films and transparencies.

Length of service. The total number of years experience in the teaching profession. This is categorized as 5 years and below, 6-10 years, 11-15 years, 16-20 years, 21 and above.

Problem Solving Method. It is a question, matter, situation or person that is difficult. It also refers to the process of removing difficulty through rational procedures involving analytical and reflective thinking.

Project Method. It is a significant unit of problematic nature, planned and carried to completion by the learners in the natural manner and involving the use of physical materials to complete the unit of experience.



Reading/Study type Method. This methodology requires students to gather facts and information or solve problems by reading printed materials.

Science. A branch of knowledge dealing with the body of facts systematically arranged and showing the operation of general laws.

Science teaching. It refers to the instruction of science in the secondary schools of Baguio City.

Science teachers. These are teachers in the High school Science subjects of Saint Louis Laboratory High School, University of Baguio-Science High School, Baguio City National High School and Pines City National High School.

Sex. Classification of the teacher and student respondents as to whether they are male or female.

Student respondents. These are high school students of Saint Louis Laboratory High School, University of Baguio-Science High School, Baguio City National High School and Pines City National High School.

Type of school currently enrolled. It is categorized as private or public secondary school.

Year Level. The level where the student-respondents belong, categorized as First year, Second year, Third year and Fourth year.



Hypotheses of the Study

On the basis of the problems that were raised, the following hypotheses were tested:

1. There are significant differences on the frequency of use of the methods used in teaching Science when compared according to teachers':

- a. age
- b. gender
- c. highest educational attainment
- d. number of years in teaching
- e. type of school currently teaching

2. There are significant differences on the preferred instructional methods of the students as to:

- a. gender
- b. year level
- c. type of school currently enrolled

3. There are significant differences between the instructional methods used by the Science teachers and the preferred instructional methods by the students.



METHODOLOGY

Locale and Time of the Study

This study was conducted in two private and two public secondary schools in Baguio City namely Saint Louis Laboratory High School (SLU-LHS), University of Baguio-Science High School, Baguio City National High School (BCNHS) and Pines City National High School (PCNHS). Figure 2 shows the map of the study.

Saint Louis Laboratory High School before was Saint Louis Boy's High located at Mabini Street, Baguio City. By the name itself, it is exclusively for boys only. Now, it is at Navy Base, Baguio City. It has already incorporated girls to have Cooperative education with boys. On the other hand, University of Baguio-Science High School is located adjacent to its college school and known to produce intelligent students because they focus on the academic line of teaching.

Baguio City National High School is at Governor-Pack Road, it was formerly known as Mountain Province High School. In 1937, the national government transferred the financial responsibility of maintaining the school to the government. With this transfer, the school was renamed Baguio City National High School. Pines City National High School formerly as Pines City High School was one of Baguio City National High School's sister school but time



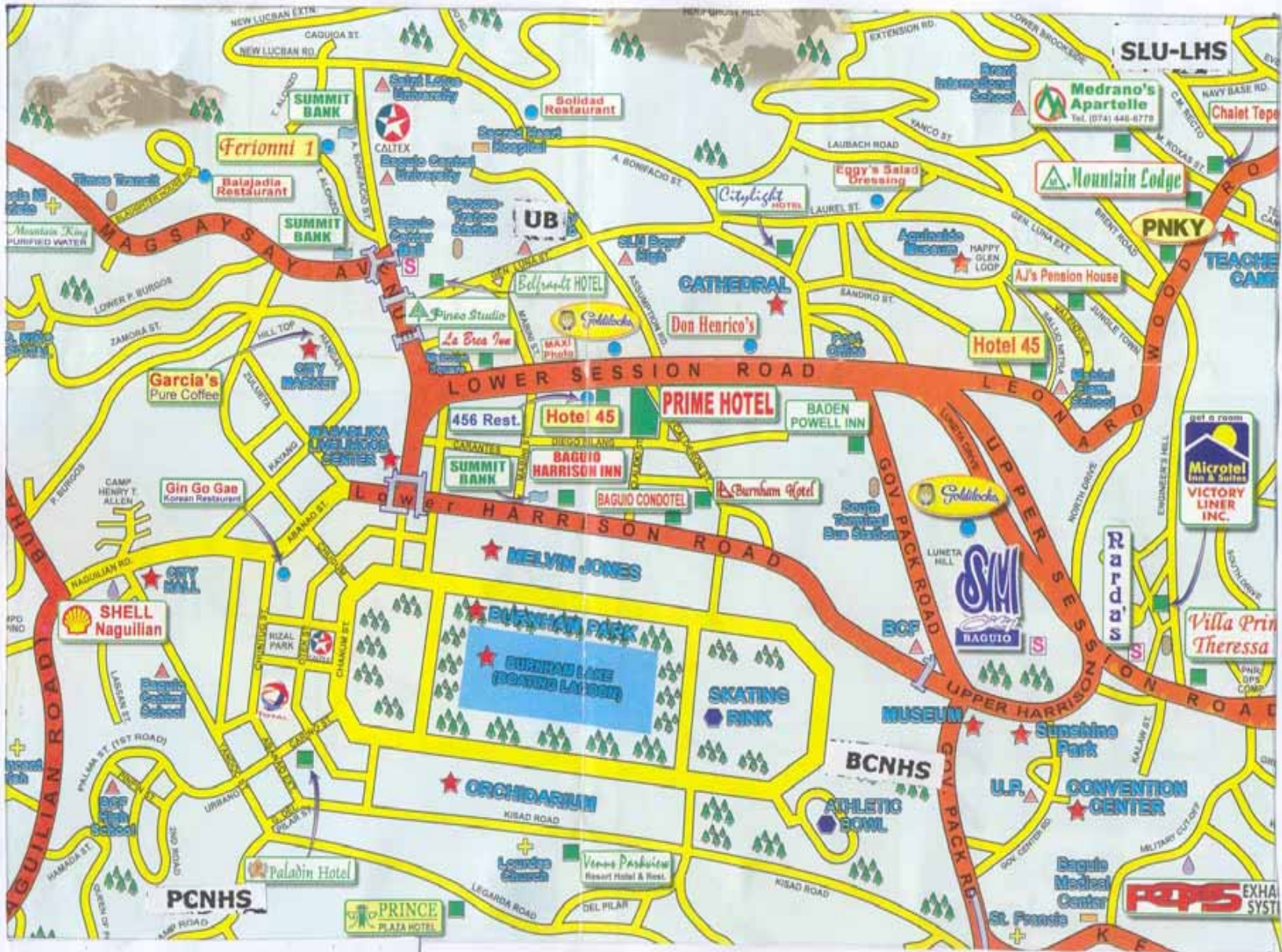


Figure 2. Location map of the Study

came that Pines City High School became independent and is now known as Pines City National High School.

Respondents of the Study

The respondents of the study are 48 instructors and 320 students in the four private and public secondary schools in Baguio City. The teachers were chosen for the reason that they are directly teaching Science to the student respondents. Likewise, the students' respondents were chosen based on the notion that among the student populace, they have the longest exposure and encounter with the formal teaching-learning process. Hence, they represented the most rational group to make an assessment on how they learn.

The profile of the teachers are as follows:

Age. Table 1 indicates the different classifications of teachers as to age groups namely: 21-30 years old, 31-40 years old, 41-50 years old, 51 and above. 50 percent have ages ranging from 51 and above; 25 percent with ages ranging from 41-50; 10.4 percent have ages ranging from 31-40 and 14.6 percent with ages ranging from 21-30.

Many of the older teachers preferred to stay in the country to continue serving the youth because they believe in the idea of Dr. Rizal that the youth is the only hope of the country. Another reason is that they expect to receive benefits after retiring. Age groups from 31-40 years old prefer to explore globally.



Teachers abroad are now in demand, that's why they grabbed the opportunity so that they can give better life to their children and family.

Table 1. Profile of teacher respondents according to age

Age	Frequency	Percent	Rank
21-30 years old	7	14.6	3
31-40 years old	5	10.4	4
41-50 years old	12	25.0	2
51 and above	24	50.0	1
Total	48	100	

Gender. Table 2 presents the gender of the teacher respondents in both public and private schools in Baguio City classified as male and female. Majority of the respondents are females with 56.25 percent while 43.75 percent are males.

The findings imply that females outnumber males in the teaching profession. The reason to the ratio is that females usually prefer to teach. Angiwan (2005) in her study stated that females preferred to teach because they have the innate feeling of being a mother and that teachers are considered as the second parents of the students and the fact that most of their time awake is spent in school.

Table 2. Profile of teacher respondents according to gender

Gender	Frequency	Percent	Rank
Male	21	43.75	2
Female	27	56.25	1
Total	48	100.00	

Educational Attainment. Table 3 presents the distribution of science teachers according to educational attainment classified as Bachelor's Degree,



Bachelor's Degree with MA units, MA Degree with Doctorate units and Doctorate Degree.

The table reveals that 27.1 percent are holders of Bachelor's Degree, 33.3 percent are holders of Bachelor's Degree with MA units, 37.5 percent are holders of MA Degree with Doctorate units and only 2.1 percent are holders of Doctorate Degree.

The finding reveals that teacher respondents possessed the necessary educational qualification in that majority of them are MA degree holders with doctorate units for teaching in the secondary level contradicting the findings of Amorin (1996), that most of the science teachers are holders of Bachelors Degree and only have some MA units.

Table 3. Profile of teacher respondents according to Educational attainment

Degree	Frequency	Percent	Rank
BS/BSE/BEED/AB	13	27.1	3
BS Degree/with MA units	16	33.3	2
MA Degree/with PhD units	18	37.5	1
PhD Degree/EdD Degree	1	02.1	4
Total	48	100	

Number of years in teaching. Table 4 presents the distribution of science teachers in terms of the number of years in the teaching profession classified as 5 years and below, 6-10 years, 11-15 years, 16-20 years, 21 years and above.

Of the science teachers 27.1 percent had served for 21 years and above, while 14.6 percent had 10 years and below experiences.



The findings imply that majority of the respondents already taught science for a long time and that they have already mastered their subject matter.

It supports the study conducted by Quipot (2005) that teachers who taught for not less than 8 long years provide better type or wide range of professional service because of their mastery of the subject matter.

Table 4 Profile of teacher respondents according to length of service

Length of Service	Frequency	Percent	Rank
5 years and below	7	14.6	4.5
6-10 years	7	14.6	4.5
11-15 years	11	22.9	2
16-20 years	10	20.8	3
21 years and above	13	27.1	1
Total	48	100	

Type of school currently teaching. Table 5 indicates the even distribution of science teachers from both public and private secondary schools in Baguio City. 50 percent was taken from both public and private schools.

Table 5. Profile of teacher respondents according to type of school currently teaching

Type of School	Frequency	Percent
Private	24	50
Public	24	50
Total	48	100



The following are the profile of the students:

Gender. Table 6 presents the gender of the student-respondents classified as male and female. A great majority of the respondents are females with a total of 66.56 percent. Males comprise 33.44 percent

This result confirms the surveys done by the National Statistics Office (2006) that females compose 68 percent which outnumber the males with 32 percent in the Philippines.

Table 6. Profile of the students as to gender.

Gender	Frequency	Percent	Rank
Male	107	33.44	2
Female	213	66.56	1
Total	320	100	

Year level. Table 7 presents the even distribution of student respondents from four schools in Baguio City which is according to year level. 25 percent per year level was selected, 80 students per school was taken with a total of 320 students.

Table 7. Profile of students as to year level

Year Level	Frequency	Percent
1 st year	80	25
2 nd year	80	25
3 rd year	80	25
4 th year	80	25
Total	320	100

Type of school currently enrolled. Table 8 shows the even distribution of students respondents according to the type of school currently enrolled. 160



students were randomly selected from the public schools and the same number was taken from the private schools.

Table 8. Profile of students as to type of school currently enrolled

Type of School	Frequency	Percent
Private	160	50
Public	160	50
Total	320	100

Instrumentation

The study made use of a descriptive method of research. The questionnaire was the main instrument used in gathering the empirical data needed in this study. Interviews were also conducted to verify data collected. Two sets of questionnaire were prepared by the researcher. Set A questionnaire was answered by the teachers and Set B questionnaire was answered by the students. The questionnaire for the teachers was composed of three parts. Part I, selected faculty characteristics (age, gender, highest educational attainment, length of service and type of school currently teaching) Part II, data on how frequent the instructional methods were used by the science teachers Part III, factors that affected the learning of Science as perceived by the teachers. On the other hand, the questionnaire for the students was composed of three parts. Part I, students profile (age, gender, type of school enrolled), Part II data on the preferred instructional



methods in teaching Science, Part III was on factors that affected the learning of Science as perceived by the students.

Data Collection

Permission was secured by the researcher from the Principal/ Officer-in-charge of each school before gathering the data. The questionnaires were administered on January 2007. The questionnaires were retrieved personally by the researcher with the help of some friends, former professors and subject teachers who were in their classroom during the administration of the questionnaire.

After the questionnaires were retrieved, the data was classified, tabulated and analyzed.

Statistical Analysis.

The data gathered in this study were presented in tables and discussed in the text. They were classified, tabulated and statistically analyzed.

The descriptive statistical tools such as frequency, ranking and getting the percentage was used in the study.

$$\text{Formula: } P = \frac{X}{N}(100\%) \quad \text{Where: } P = \text{percentage}$$

$$\quad \quad \quad \quad \quad \quad \quad \quad \quad \quad X = \text{total frequency}$$

$$\quad \quad \quad \quad \quad \quad \quad \quad \quad \quad N = \text{total population}$$

The average weighted mean was used to present the frequency of use of instructional materials used by science teachers, the preferred instructional



materials by the students and the factors perceived by both the students and teachers in the selected schools in Baguio City.

The formulas used in the study are as follows:

$$\bar{X} = \frac{\sum x}{n}$$

Where :
 \bar{X} = weighted mean
 $\sum x$ = summation of all the scores
 n = total frequency

The scale used in determining the frequency of use of instructional methods is as follows:

Numerical value	Limits	Descriptive Equivalent
1	1.00-1.75	Never
2	1.76-2.50	Seldom
3	2.51-3.25	Often
4	3.26-4.00	Always

The scale used in determining the factors that affect the learning of science as perceived by the students and teachers is as follows:

Numerical value	Limits	Descriptive Equivalent
1	1.00-1.75	Not at all
2	1.76-2.50	fairly affect
3	2.51-3.25	much affect
4	3.26-4.00	very much affect

Essentially, the formula for Friedman's two way analysis of variance by ranks determined the differences among the items identified in the study.

$$X^2_r = \frac{12}{NK(K+1)} \sum (R_1^2 + R_2^2 \dots)^2 - 3N(K+1)$$



where:

X_r^2 = Friedman's Two way ANOVA by ranks

R= number of rows

K= number of columns

As the basis of acceptance or rejection of the hypotheses, 0.05 was the level of significance used.



RESULTS AND DISCUSSION

This chapter discussed various aspects that are related to the instructional methods utilized by secondary science teachers in selected schools in Baguio City. The data collected were tabulated and discussed accordingly.

The data presented in this chapter were derived from the responses to the questionnaires administered and from interviews with 320 students and 48 teachers.

Frequency of use of instructional methods used by Science teachers in Baguio City

The important concern of science teachers is determining and choosing the most appropriate effective instructional method in presenting the lesson. According to Salandanan (2001), the learning process is a significant factor especially in the ability to know the students' background information previously learned, availability of instructional materials and other facilities in the Science room. In selecting the instructional methodology, no one is in the best position to make the proper decision but the teacher herself because she is familiar with the characteristics of her students and their needs, interests and attitudes.

Table 9 shows the instructional methods used by science teachers in Baguio City. They are classified as demonstration method, lecture method, project



method, laboratory method, problem solving method, fieldtrip method, reading method, games method and debate method.

Table 9. Frequency of use of instructional methods used by Science teachers in Baguio City

<i>Methods</i>	<i>WM</i>	<i>D.E.</i>	Rank
1.Demonstration	3.16	often	3
2.Lecture	3.39	always	1
3.Project	1.87	seldom	8
4.Laboratory	2.97	often	4
5.Problem Solving	3.37	always	2
6.Fieldtrip	1.70	never	9
7. Reading	2.91	often	5
8.Games	2.35	seldom	6
9.Debate	2.08	seldom	7

Legend:

WM=weighted mean

D.E.=Descriptive Equivalent

The leading instructional method was lecture with an average weighted mean of 3.39. The least utilized instructional method in teaching science was fieldtrip as indicated by an average weighted mean of 1.70.

Potter (1996) stated that lecturing is one of the most frequently used methods in teaching not only in science but also in other subjects in the secondary level. An interview from Lagasca (2007) of Pines City National High School states that:

“I daily use lecture method in teaching science because it is adaptable to many different settings, especially in a large group. I want to emphasize that lectures may also be used to introduce a unit of instruction and may be combined with other teaching methods to give added meaning and direction”.



On the contrary, Alcorn (1978) specified that lecture technique can only be functional when it is correctly used such as in explaining a problem, illustrating and demonstrating a process or a point, telling a story or introducing a new lesson.

On the other hand, the purpose of fieldtrip is to provide a learning experience that is unique and can not be accomplished in the classroom. Datoc (2007) of Pines City National High School emphasized that:

“Fieldtrip is a very interesting instructional method to use but I never make lesson plans that involve fieldtrips because obviously as a science teacher I should decide on the appropriateness, timing, destination and place of the trip in the instructional sequence. And the fact that, the budget of the school is not enough for fieldtrips especially in public schools. Parents also complain if teachers, classmates or school administration will collect money”.

Parents also influence their child’s trait and their learning. According to Reddy as cited by Fermin (2003), educators consider parents’ involvement as essential to any educational program. The basic assumption underlying this point of view is that parents can play an educative role to their children.

Demonstration, Laboratory and Reading methods are often utilized as instructional methods in teaching science. Demonstrations are often used due to safety concerns or lack of equipments. This is actually proven when a survey conducted by Molina as cited in the book of Quipot (2005), found that inadequacy of Science equipments was the most serious problem encountered not only in



grade schools but also in secondary schools. Laboratory method is given to formalize students experience and make connections between prior and present knowledge but Brandwein (1993) stated that laboratory experiments do not provide opportunities for the students to use their minds to solve problems posed in the laboratory. All that is required is to make sure all the detailed instructions found in the laboratory manual are carried out and all the blanks are filled after the experiment is completed. Reading method exposes people to the accumulated wisdom of human civilization as what Garlejo (2007), a Filipino teacher from Pines National High School stated:

“The ability to read has economic consequences. Students who are better-than-average readers are also higher-than-average earners or are more likely to have high-paying jobs. The growing technicalization of society has brought increasing demands for literacy, which the schools are hard pressed to meet. A higher level of literacy is needed in business and industry, in the armed forces, and even in everyday life. The reading ability needed to comprehend materials are important to daily living, such as income tax forms and newspapers, has been estimated to be high. Some efforts have been made to simplify forms and manuals, but the lack of sufficient reading ability definitely impairs a student capacity to function in modern society”.

Teachers should therefore encourage students to read materials aside from textbooks that are appropriate to student’s abilities and program objectives.

Games, debate and project methods are seldom used in teaching science. Teachers seldom use games because it is very hard to look for a game that is appropriate to the objectives of the lesson. Debate method is only given according



to some teachers when there's ample time because students have to understand informations concerning their sides on the given issue and develop the skills of analysis and evaluation concerning their opponent's position which will take time. Project method is seldom used because from observations, teachers don't like the responsibility of providing time and assistance as the students work on their projects, particularly in locating resources.

On the contrary, the findings of Levinson (1994) added that a number of distinguished educators have urged that an effective teaching method requires learning experiences which are designed in such a way that they reflect and illustrate the conceptual and methodological structure of discipline. Hence, teachers are encouraged to make use of different methods in teaching science which they think is suitable for the kind of students they have.

Frequency of use of instructional methods used in teaching science as to variables

Age. Table 10 shows the frequency of use of teaching methods as to age. The computed value as indicated by 10.4 was higher than the tabular value of 7.82 using 0.05 level of significance. The hypothesis therefore stating that the teachers from different age groups have different perceptions in using science instructional methods is accepted.

From this data, ages ranging from 31-40 had the highest average weighted mean of 3.80 in utilizing lecture method and ages ranging from 21-30 had the lowest mean of 3.28 in utilizing lecture method in teaching science. The study of



Lubrica (1996) states that science teachers who are in their younger years are in their most energetic and productive years. This tries to explain that fresh graduates have many ideas in mind. Aside from lecturing, they think of better ways of tackling the subject matter. This stage may be referred as the trial and error stage. This explains why teachers aging from 31-40 are already tired from experimenting what instructional method suits best a subject matter and so, they just elaborate or explain the topic through lecturing.

Table 10. Frequency of use of methods used in teaching science as to variables

<i>Variables</i>	X^2_r	$X^2_{0.05}$	Result
1.Age	10.4	7.82	significant
2. Gender	5.44	3.84	significant
3. Educational attainment	6.73	7.82	not significant
4. Length of service	13.18	11.07	significant
5. type of school	2.77	3.84	not significant

Legend:

X^2_r = computed value

$X^2_{0.05}$ = tabular value

Ages ranging from 51 years and above used lecture and problem solving methods in teaching science. Even if teachers teaching science grow old, they have different perceptions on what instructional method is best in teaching as long as they are committed to their work.

Gender. Table 10 presents the comparison of frequency of use of instructional methods as to gender.



The computed value as indicated by 5.44 was higher than the tabulated value of 3.84 using 0.05 level of significance. Therefore, the hypothesis stating that the male and female science teachers; have different perceptions regarding the instructional method to be utilized in teaching science is accepted.

Male science teachers had higher frequency rate of using lecture as indicated by 3.47 compared to female science teachers who had 3.40.

According to Angel (1993), males do not excel in language arts, spelling and penmanship, most likely not to be creative and do not have the initiative to look for ways and means to execute strategies effectively. These can be the reasons why males prefer lecture over other teaching methods.

On the contrary, according to Sison (2000), females are more effective teachers in handling teaching strategies than males. Thus, female teachers can be more creative and have more initiative to look for ways and means to execute strategies effectively.

Educational attainment. Table 10 shows the comparison of frequency of use of teaching methods as to educational attainment of teachers who are teaching science.

The computed value as indicated by 6.73 was lower than the tabulated value of 7.82 using 0.05 as level of significance. This indicates that the hypothesis that the science teachers of different educational attainments have varied perceptions on what instructional method to be used in teaching science is



rejected. This means that no matter the degree the teachers have, their perceptions on instructional methods used in teaching science are similar.

The educational attainment of science teachers classified as Bachelor's Degree, Bachelor's Degree with MA units, MA Degree with PhD units and PhD Degree prefer lecture in teaching science. Quipot (2005) emphasized that teachers whatever degree they hold are acquainted with current and varied ideas in science that is why they see lecture as the best way to share these new ideas.

Interviews from teachers with different educational attainment emphasized that lecture is a traditional procedure that carries prestige as a dignified and respectable teaching procedure. Its efficacy depends upon who does the lecturing, what new informations have to be imparted and how it is presented.

Length of service. Table 10 presents the comparison of frequency of use of instructional methods as to the length of service of science teachers in Baguio City.

As gleaned in Table 10, the computed value of 13.18 was higher than the tabulated value as indicated by 11.07 using 0.05 as level of significance. The hypothesis that teachers with different length service have different perceptions on instructional methods in teaching science is accepted. This means that science teachers with different length service have different perceptions on instructional methods to be used in teaching science.



Teachers who taught for 5 years and below always utilized lecture in teaching science; often used in teaching are demonstration, laboratory, problem solving and reading method; seldom used in teaching are project, fieldtrip, games and debate methods

Those teachers who had 6-10 years teaching experiences always utilized lecture in teaching science; often used in teaching are demonstration, laboratory and reading method; seldom used in teaching are problem solving, games and debate method; never used are project and fieldtrip method in teaching science.

In addition, those with 11-15 years always utilized lecture in teaching science; often used in teaching are demonstration, laboratory, problem solving and reading methods; seldom used in teaching are games and debate methods; and never used are project and fieldtrip methods in teaching science.

Furthermore, the teachers with 16-20 years always utilized demonstration, lecture and problem solving method in teaching science; often used are laboratory and reading method; seldom used are project, fieldtrip, games and debate method in teaching science.

Finally, those with 21 years and above utilized demonstration and problem solving method in teaching science; often used in teaching are lecture, laboratory and game method; seldom used are project method, fieldtrip and debate method in teaching science.



From the given data, teachers who taught for 16-20 years have utilized different instructional methods in teaching science. Teachers who acquired many experiences will likely discover new techniques and styles of teaching other than using lecture method in teaching science. Binay-an (1985) as cited by Quipot (2005) added that teachers with 16-20 years in service have already enough science materials and equipments because they have started collecting and making them during their early years of service. These are the reasons why they are more acquainted with other instructional methods.

She also identified the teaching difficulties of elementary school teachers of Modern science in selected schools in Manila. The study revealed that teachers with less experience in teaching science have larger percentage of errors than those who have more teaching experience and Potter (1995) as cited by Soria (1999) indicated that teaching effectiveness is not positively related to experiences and professional service. She found out that those teachers with little or no teaching experience is judged by the students to be as good as teachers with 4 or more years in teaching.

Type of school. Table 10 shows the comparison of frequency of use of instructional methods as to type of school whether public or private.

The computed value of 2.77 was lower than the tabulated value of 3.84 using 0.05 as level of significance. This indicates that the hypothesis that hypothesis that both public and private school science teachers in Baguio City



have different perceptions regarding what instructional method to use in teaching science is rejected. This means that science teachers whether public or private, have similar perceptions on the instructional method to be used.

The results of the study show that science teachers of both types of schools utilized the same instructional methods in teaching science. According to some public and private teachers, funds are not enough to support all the needs of the school especially on materials and laboratory equipments that's why many of them just use lecture as a method of teaching. This was proven by Brown (1968) as cited by Lubrica (1996) that the deficiency of teachers stemmed from insufficient facilities. Teachers from public and private schools are therefore challenged to make use of other instructional materials aside from what the government can give to supplement their tasks as a teacher for their students' growth and development.

Instructional methods preferred by the students in learning science

If the teacher possess good personality traits, the students will develop a good performance in school, Pakilo and Palig-ad (2001) as cited by Amorin (1996) emphasized that the more the teacher succeeds in establishing a genuine relationship of trust and confidence, the more the students are prepared to meet the requirements set by them.



Table 11. Instructional methods preferred by the students in learning science

<i>METHODS</i>	<i>WM</i>	<i>D.E.</i>	Rank
1.Demonstration	3.33	highly preferred	2.5
2.Lecture	3.40	highly preferred	1
3.Project	2.73	moderately preferred	9
4.Laboratory	3.33	highly preferred	2.5
5.Problem Solving	3.21	moderately preferred	5
6.Fieldtrip	3.13	moderately preferred	6
7. Reading	3.05	moderately preferred	7
8.Games	3.30	highly preferred	4
9.Debate	2.93	moderately preferred	8

Legend:

D.E. = Descriptive Equivalent

WM = Weighted Mean

Table 11 shows the instructional methods preferred by the students in selected schools in Baguio City. The leading instructional method preferred by the students in learning science was lecture with an average weighted mean of 3.4 and the least preferred instructional method in learning science was project method with an average weighted mean of 2.73.

The lecture is particularly suitable for introducing a new subject and for explaining the necessary background information. By using lecture, the teacher can offer students with varied backgrounds and a common understanding of essential principles and facts. This can be the reason why students in secondary schools in Baguio City preferred lecture as a way to learn in their science subject.

Students also highly preferred demonstration and laboratory with an average weighted mean of 3.33. They also highly preferred games with an average weighted mean of 3.30 in learning science.



Interviews with some students in private schools emphasized that demonstrations and laboratory methods of teaching is based on the simple, yet sound principle that they can learn by doing. Through doing, students learn to follow correct procedures and to reach established standards. This is also true in using progressive principles of play as an effective way for the teacher to encourage learners to become effective decision makers and intelligent performers. The primary idea is that students will be able to understand a variety of games more effectively and as a result enjoy the games they are playing more.

Interviews with some public students revealed that they are more likely to become explorers where in they will try everything in order to learn and from their experience they will choose the best. They also have more self-confidence in learning that's why they wanted to have more experience which actually pushes them to prefer demonstration and laboratory methods.

Students moderately preferred project, problem solving, fieldtrip, reading and debate methods in learning science. Having a project is expensive but they can actually apply and develop their skills in the different kinds of tasks or activity the teacher plans. Some of the students also felt that they don't have the ability to solve problems. Some also said that they just don't know how to organize the given informations and use these informations to obtain the desired outcomes. Readings as well as debates are boring according to some students and there are very few interesting topics that are debatable in the society. Lastly,



students consider educational fieldtrips as impossible now a days because of lack of school funds.

Instructional methods preferred by the students in learning science as to variables

Gender. Table 12 presents the preferred instructional methods of the students in learning science as to gender. The computed value as indicated by 2.77 was lower than the tabular value of 3.84 using 0.05 level of significance. This indicates that the hypothesis that male and female students have different preferences on what method suits the learning of science is rejected. Both male and female students prefer lecture and game methods in learning science According to Odiem (1999), male students are predominantly dynamic learners and female students are mostly innovative learners. Despite the slight discrepancy, there's no difference in their preference in learning styles.

The results confirm the findings of Lalan as cited by Puntaue (2004), that student's personal background such as sex did not affect the performance of the students. That is why male and female students prefer lecture where they can listen and apply what they have learned

Table 12. Instructional methods preferred by the students in learning science as to variables

<i>Variables</i>	X^2_r	$X^2_{0.05}$	Result
1. Gender	2.77	3.84	not significant
2. Year level	2.36	7.82	not significant
3. type of school	4.00	3.84	significant

Legend:

X^2_r = computed value
 $X^2_{0.05}$ = tabular value



Year level. Table 12 shows the preferred instructional methods of students in learning science as to year level classified as 1st year to 4th year. The computed value as indicated by 2.36 was actually lower than the tabulated value of 7.82 using 0.05 as level of significance. This indicates that the hypothesis stating that the students from different year levels have different preferences on what instructional methods in learning science is rejected.

First year to fourth year students preferred lecture in learning science. Interviews from students reflect that they can learn new concepts through listening to lectures because science by nature is dynamic. As science develops, some concepts become obsolete. New concepts are born in the form of new discoveries and therefore the teacher is expected to share these advancements through lecturing.

Type of school. Table 12 presents the type of school where the computed value at 4.00 and the tabular value at 3.84 using 0.05 as level of significance, indicate that the computed value was higher than the tabular value. Therefore, the hypothesis stating that the public and private schools where the students are currently enrolled have different preferences on instructional methods in learning science, is accepted. This means that students from public and private schools have different perceptions on instructional methods used in learning science.



Students who are currently enrolled in public schools prefer lecture method and the least preferred is debate method in learning science. Interviews from a number of students in public schools mentioned that they have to face the reality that as the population increases in government schools, the opportunity to handle and manipulate equipments become lesser. “Practicality” as they say is the reason why they prefer lecture and demonstration in learning science. The least preferred is debate method. Structured discussion in class can lead naturally to the most formal method for taking sides: wherein the debate can be actually boring for some science topics.

Students who are currently enrolled in private schools prefer game method. Interviews from students in private schools emphasized the use of game method because they believe that learning science is fun and easy through games. Other preferred methods are lecture, demonstration, problem solving, laboratory and fieldtrip methods. Some of these methods are preferred daily in classroom settings. For them, project is necessary when a student has failing grades or for others who violate the policies of the school like discipline.

Comparison between the instructional methods utilized by the teachers and the preferred instructional methods of students

Table 13 shows the instructional methods utilized by the teachers and the preferred instructional methods by the students in the selected schools in Baguio City.



Table 13. Instructional methods utilized by the teachers and the preferred instructional methods of students

<i>METHODS</i>	<i>TEACHERS</i>	<i>STUDENTS</i>
	<i>WM</i>	<i>WM</i>
1. Demonstration	3.16	3.33
2. Lecture	3.39	3.40
3. Project	1.87	2.73
4. Laboratory	2.97	3.33
5. Problem Solving	3.37	3.21
6. Fieldtrip	1.70	3.13
7. Reading	2.91	3.05
8. Games	2.35	3.30
9. Debate	2.08	2.93

Legend:

WM=weighted mean

$X^2_r=2.77$ not significant

$X^2_{0.05}=3.84$

The computed value as indicated by 2.77 was lesser than the tabulated value of 3.84. This means that the hypothesis stating that there is a significant difference between the utilized instructional methods by the teachers and the preferred instructional methods by the students is rejected. This further means that teachers and students have similar perceptions on instructional method preferences.

Science teachers utilized lecture in teaching science with an average weighted mean of 3.39 while students also preferred lecture in learning science with an average weighted mean of 3.40. Teachers also utilized demonstrations and problem solving which are actually the same with that of the students' preference in learning science.



Orstein (1992) stated that lecture method is the oldest approach to teaching in higher education. A lecture is a convenient way to instruct large groups of students. Lecture can be used to present information that would be difficult for the students to get from other sources. Hyman (1997) added that lecture can also be used successfully to supplement other teaching devices and methods. Lecturing is unquestionably the most economical of all teaching methods in terms of time required to present a given amount of material. These are the reasons why science teachers utilize lecture in teaching science.

On the contrary, Bernardino (1999) emphasized that although the lecture method can help the teacher meet special challenges, it does have several drawbacks, such that many students willingly let the teacher do all the work. Maybe this is the reason why the students preferred lecture in learning science and that they are lazy to do their part as students. Learning is an active process and lecture method tends to foster passiveness and does not bring about maximum desired learning outcomes. To achieve desired learning outcomes through the lecture method, the teacher needs to have considerable skills in speaking.

Factors that are perceived by the students and teachers that affect learning of Science

Factors encountered in learning science are a great hindrance for effective teaching and learning. This portion of the study tries to find out these factors that are perceived by the students that really affect the learning of Science.



Table 14 presents the factors that affect the learning of science as perceived by the students and by the teachers.

Table 14. Factors that are perceived by the students and teachers that affect learning of science

<i>FACTORS</i>	<i>STUDENTS</i>		<i>Rank</i>	<i>TEACHERS</i>		Rank
	<i>WM</i>	<i>D.E</i>		<i>WM</i>	<i>D.E.</i>	
1.knowledge of the subject matter by the teacher	3.50	vma	1	3.70	vma	1
2.complexity of the subject matter	3.24	ma	2	3.37	vma	2
3.availability of textbooks	3.12	ma	3	3.10	ma	4
4. in adequacy of library facilities	2.88	ma	4	3.04	ma	6
5.in adequacy of audio-visual room, equipment and facilities	2.73	ma	6.5	3.02	ma	7
6.limited school site	2.73	ma	6.5	2.77	ma	10.5
7.poor classroom conditions	2.69	ma	9.5	3.08	ma	5
8.in adequacy of children's table, chairs and lockers	2.37	fa	12	2.77	ma	10.5
9.lack of manipulative materials	2.69	ma	9.5	2.95	ma	9
10. lack of learning resource centers/corners	2.71	ma	8	2.75	ma	12
11.inappropriate attitudes of the students	2.80	ma	5	3.25	ma	3
12.lack of administrative support	2.63	ma	11	3.00	ma	8

Legend:

4-very much affect (vma) = (3.26-4.00)

3-much affect (ma) = (2.51-3.25)

2-fairly affect (fa) = (1.76-2.50)

1- not at all (na) = (1.00-1.75)

WM=weighted mean

D.E=Descriptive Equivalent



The knowledge of the subject matter by the teacher ranks first with an average weighted mean of 3.50 as perceived by the students and 3.70 as perceived by the teachers. Interviews from students of both private and public schools pointed out that the knowledge of the subject matter by the teacher have a great impact on them to be motivated in studying. Students do not look only on the physical aspect of their teachers but also on the mental aspects. They further said that they really respect teachers who are not only knowledgeable but also have a unique way of sharing their knowledge to the students. This statement is supported by Cannolly (1993) as cited by Taeza (1995) when he said that learning and understanding the lesson is poor when students do not like the technique of instruction, personality traits and characteristics of the teachers. If the teacher is unapproachable, the students end up having difficulty in understanding the lesson.

Second factor that very much affects the learning of science was the complexity of the subject matter with an average weighted mean of 3.24 as perceived by the students and average weighted mean of 3.37 as perceived by the teachers. According to Gregorio (1996), the most important determinant in the entire school situation is the teacher. A good teacher is not necessarily one born with a teaching instinct. More likely, he has been a product of years of effort. It is quite difficult to over estimate the importance of knowledge of subject-matter in the teaching process. Only teachers with good understanding of the subject matter can organize effectively what is to be taught. The knowledge of one's subject is



tremendously important as the knowledge of the method of teaching and knowledge of children, society and the like. The more a teacher knows about the subject, the more he is able to present the subject in a stimulating way when students are confused and discouraged and knows what remedial action he has to take.

Textbooks are very essential factors that supplement the teachers' role as a facilitator. In the Philippines, lack of textbooks is a very common problem especially in the government schools. Except for the lack of funds to reproduce a lot of textbooks, natural disasters such as typhoons can also cause the destruction of school facilities like textbooks. As reported in ABS-CBN's "Magandang Gabi Bayan" last January 29, 2007, children from Lano, Bohol were asking for donations from any concerned citizen because their textbooks were destroyed due to the typhoon that hit their area last December.

In library institutions, there are a lot of collections of books and other informational materials made available to students for reading, study or reference. The central mission of a library is to collect, organize, preserve and provide access to knowledge and information which can not be attained if the library facilities are inadequate. Teachers have no resources to assist them in their work, students lack supplements to enhance their classroom experiences thus, they will not learn skills in locating sources of informations and unfortunately they can not develop good reading and study habits.



A factor for quality learning and teaching appears to be dependent on concrete materials or illustrations as students may see, feel and manipulate them. Most schools could not afford to provide a concrete basis for all educational activity, even though it was possible or desirable. In teaching and in learning, visual devices supply one form of aid to attention, understanding, imagination and incentive to action. Visual devices are used to attract attention. According to Gregorio (1996), the teacher who has a repertoire of good visual devices at hand usually maintains full attention. Visual devices are also used to facilitate reasoning and understanding. The fundamental reasons for the use of visual devices are to stimulate imagination and provide incentives to actions. Unfortunately, the larger possibilities of intellectual development of students are hampered because of the failure to adequately stimulate the imagination and the will for intellectual activity.

Good school site is important in promoting efficient instructions and it also contributes to the general welfare of the students as well as the whole community. Location, health, safety and lighting are factors to be considered in the construction of school buildings.

A well managed classroom according to Gregorio (1996) will give the students rich opportunities for mental growth and development. A good classroom condition produces favorable working conditions conducive for good learning. But as the population in a classroom increases, the ideal classroom conditions are



now put aside. In fact, teaching and learning is impossible in poor classroom conditions.

Inappropriate attitude of the students is always a problem for the teachers. Developing expertise in using behavior modification will not relieve teachers from the necessity to work hard. According to Cannolly (1993), teachers need to change their behavior, they have to keep a daily record of students' performance and have to be very systematic. They must be willing to fail and try again in order for the students to be encouraged to study hard and behave inside the classroom.

School administrators play an important role in the improvement of the teaching and learning situations and the conditions that affect them. Administrators should look for solutions to the existing problems that really affect the teaching and learning conditions.

On the other hand, inadequacy of children's tables, chairs and lockers fairly affect the learning of science as perceived by the students with an average weighted mean of 2.37 while their teachers were much affected with a mean of 2.77. This means that according to students' perceptions, they are not so much affected in learning science even if there is a shortage or inadequacy of tables, chair and lockers because they can still learn with out it. What is important to them is the presence of the teacher inside the classroom, unlike the teachers who are much affected when they see that their students don't have tables, chairs and



lockers. For them, the basic classroom equipments are the tables and chairs in order for the students to have better learning experiences.

The problems met in science teaching were found to be obstacles to the success of science education. Several fields have revealed a number of shortcomings and weaknesses of the educational system. Dasallas (1994) enumerated some of the problems which prevailed during the implementation of the Revised secondary education curriculum which are as follows 1) inadequacy of instructional materials for the students, 2) lack of congruence of instructional materials and learning competencies specified by the Bachelor of Secondary Education curriculum 3) inadequacy of preparation of teachers and 4) lack of substantial content. Brown as cited by Lubrica (1996), found out that the deficiency of teaching stemmed from poor teaching of faculty members, insufficient facilities, largeness of classes and overloading of teachers. These are parallel to the problems identified in the present study.

Soria (1999) added that the teacher quality has remained dismally low as evidenced by the evaluation of the Revised secondary education program of 1991 of teachers' performance in subjects taught, one of which is Science and Technology.



SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The study generally dealt with the instructional methods used by secondary science teachers in Baguio City.

This study was conducted in 4 private and public schools in Baguio City namely; Saint Louis University-Laboratory High School, University of Baguio-Science High School, Baguio City National High School and Pines City National High School.

The respondents of the study were 320 students and 48 science teachers.

The questionnaires were retrieved personally by the researcher and interviews with the respondents were the main instruments used in gathering the empirical data needed in this study.

The data gathered were presented in tables and discussed in the text. As the basis of acceptance or rejection of the hypothesis, 0.05 was the level of significance used.

Based on the respondents' answers, the researcher came up with the following findings:

1. The teachers always utilized lecture method in teaching science with a weighted mean of 3.39 while they never utilized fieldtrip as a method of teaching with weighted mean of 1.70.



2. a. Teachers belonging to the age group ranging from 31-40 had the highest weighted mean of 3.80 in using lecture as an instructional method in teaching science while teachers with ages ranging from 21-30 had the lowest weighted mean of 3.28.

b. Males always utilized lecture as a method in teaching with a weighted mean of 3.47 while females had a lower weighted mean of 3.40.

c. Teachers with Bachelor's degree, Master's degree and Doctorate degrees always utilized lecture in teaching Science.

d. Teachers with 6-10 years in service had the highest weighted mean of 3.85 in using lecture as an instructional method in teaching science while teachers with 21 years and above in service had the lowest weighted mean of 3.28.

e. Teachers who are currently teaching in private and public schools always preferred lecture in teaching science.

3. Lecture method with a weighted mean of 3.40 was highly preferred by students in learning science while project method was moderately preferred with a weighted mean of 2.73.

4. a. Both male and female students highly preferred lecture as an instructional method in learning science.

b. First, Second, Third and Fourth year students preferred lecture as an instructional method in learning science.



c. Students who are currently enrolled in public schools highly preferred lecture method in learning science with a weighted mean of 3.40 while students from private schools with a weighted mean of 3.55 highly preferred game method in learning science.

5. Both teachers and students highly preferred lecture as a teaching method in science with a weighted mean of 3.39 and 3.40 respectively.

6. Knowledge of the subject matter by the teachers very much affected the students and the teachers with a weighted mean of 3.50 and 3.70 respectively. The teachers were also very much affected by the complexity of the subject matter. On the other hand, students were fairly affected by the inadequacy of student's tables, chairs and lockers.

Conclusions

Guided with the salient findings of the study, the following conclusions are derived:

1. Science teachers always utilize lecture and problem solving as an instructional method in teaching science.

2.a. There are significant differences among the different age groups of the science teachers on the frequency of use of instructional methods.

b. There are significant differences between the male and female science teachers on the frequency of use of instructional methods.



c. There are no significant differences among the science teachers as to educational attainment on the frequency of use of instructional methods.

d. There are significant differences among the science teachers as to length of service on the frequency of use of instructional methods.

e. There are no significant differences between the public and private secondary science teachers on the frequency of use of instructional methods.

3. Students highly preferred lecture, demonstration, laboratory and game methods in learning science.

4. a. There are no significant differences between the male and female students on their preferences of instructional methods

b. There are no significant differences among the first, second, third and fourth year students on their preferences of instructional methods.

c. There are significant differences between the public and private school students on their preferences of instructional methods.

5. There are no significant differences between the teachers and students on the instructional methods used in teaching and learning science.

6. Both teachers and students consider the knowledge of subject matter by the teacher as the leading factor that affects the learning of science.

Recommendations

In the light of the foregoing summary of findings and conclusions, this study recommends the following:



1. Teachers are encouraged to make use of different teaching methodologies aside from lecture in teaching science to meet the needs and suit the nature of the students like project method, games, debate method and fieldtrips.

2. Teachers need to be more dynamic and open minded in using varied instructional methodologies as they grow older in the teaching profession.

3. Students are also encouraged to be more dynamic in the teaching-learning process by engaging in projects, debates, fieldtrips, problem solving and reading.

4. Schools can coordinate science activities involving debates on science issues, fieldtrips and competitions on research projects to motivate students to participate

5. Seminars and workshops on instructional methodologies can be provided to teachers so they become oriented and made aware on the use of a variety of teaching methods.

6. School administrators need to prioritize the procurement of tables, chairs and lockers to improve learning in science.



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Appendix A

LETTER OF PERMSSION TO ADMINISTER QUESTIONNAIRES

JC 311 Balangcia Road
Pico La Trinidad, Benguet

January 2007

Dr. Elma D. Dona-al
Principal
Baguio City National High School
Main Campus, Baguio City

Madam:

The researcher is conducting a study entitled, “INSTRUCTIONAL METHODS USED BY SECONDARY SCIENCE TEACHERS IN BAGUIO CITY”, in partial fulfillment of the requirements for the degree MASTER OF ARTS IN EDUCATION (Educational Administration and Supervision), Benguet Sate University.

In this regard, the researcher is seeking permission from your good office to administer the prepared questionnaire and gather data from a sample of students and teachers from your school. The data that will be collected from your school will help a lot in the completion of this research.

The assistance that will be given to the researcher shall be highly appreciated.

Very truly yours,

Richeal B. Tagle
Researcher



Appendix B

LETTER TO THE TEACHER-RESPONDENT

JC 311 Balangcia Road
Pico La Trinidad, Benguet

January 2007

Sir/Madam,

Greetings!

This study is conducted to determine the teaching strategies in Science used in both public and private Secondary Schools in Baguio City.

This study is then important in providing insights and facts about instructional methods as potent variables affecting Science teaching in Secondary Schools in Baguio City.

Please answer the questionnaire, considering the fact that there are no right or wrong answers to these questions. Rest assured that the information you will furnish and your identity will be treated with utmost confidentiality.

Thank you for your support and cooperation.

Very truly yours,

Richeal B.Tagle
Researcher



Appendix C

LETTER TO THE STUDENT-RESPONDENT

JC 311 Balangcia Road
Pico La Trinidad, Benguet

January 2007

Dear Student,

Greetings!

This study is conducted to determine the teaching strategies in Science used in both public and private Secondary Schools in Baguio City.

This study is then important in providing insights and facts about instructional methods as potent variables affecting Science teaching in Secondary Schools in Baguio City.

In view of this, kindly answer honestly and frankly the questions asked in the questionnaire. All the answers that you will provide have nothing to do with your grades. They will be held strictly confidential and will be used for the purpose of this study only.

Thank you for your kind consideration.

Very truly yours,

Richeal B. Tagle
Researcher



Appendix D

SURVEY QUESTIONNAIRE
(For Teaching Staff)

I. Personal data

- a. Name (*optional*) _____
- b. Age (please check):
- ____ 21-30 years old
- ____ 31-40 years old
- ____ 41-50 years old
- ____ 51 and above
- c. Gender:
- ____ Male
- ____ Female
- d. Educational Attainment
- ____ BS/BSE/BEED/AB
- ____ BS Degree/with MA units
- ____ MA Degree/with PhD units
- ____ PhD Degree/EdD Degree
- e. Length of Service
- ____ 5 years and below
- ____ 6-10 years
- ____ 11-15 years
- ____ 16-20 years
- ____ 21 and above
- f. Type of school currently teaching
- ____ Private
- ____ Public



II. Below are list of instructional methods in Science teaching

DIRECTION: Please check the number that corresponds to your answer on how often you use the said instructional methods.

4-always (everyday)

3-often (every other day)

2-seldom (once a week)

1- never (not at all)

METHODS	4	3	2	1
• Demonstration				
• Lecture				
• Project				
• Laboratory/experimental				
• Problem solving				
• Fieldtrip				
• Reading/study type				
• Games				
• Debate				

• Others, please specify _____

III. What are the factors that affect the learning of Science?

DIRECTION: Please check the number that corresponds to your answer

4-very much affect

3-much affect

2-fairly affect

1- not at all

Factors that affect the learning of Science	4	3	2	1
1. knowledge of the teacher				
2. complexity of the subject matter				
3. availability of textbooks				
4. in adequacy of the library facilities				
5. in adequacy of audio-visual room, equipment and facilities				
6. limited school site				
7. poor classroom conditions				
8. in adequacy of children's tables, chairs, lockers				
9. lack of manipulative materials				
10. lack of learning resource centers/corners				
11. inappropriate attitudes of the students				
12. lack of administrative support				

13. Others, please specify _____



Appendix E

SURVEY QUESTIONNAIRE
(For students)

I. Personal data

a. Name (*optional*) _____

b. Year level (please check):

- First year
 Second year
 Third year
 Fourth year

c. Gender:

- Male
 Female

d. Type of school

- Private
 Public

II. Below are lists of instructional methods in teaching Science.

DIRECTION: Please check the number that corresponds to your answer on what instructional methods you prefer in learning Science.

4-highly preferred
2-fairly preferred

3-moderately preferred
1- not preferred

METHODS	4	3	2	1
• Demonstration- this learning activity is performed by a student or a teacher while the rest of the class observe. This activity is done for experiments involving expensive materials or due to lack of materials.				
• Lecture- it is a teaching procedure for clarifying or explaining a major idea cast in the form of question or a problem. This type can be dominated by the teacher, can be discussion between the class and the teacher, and can be accompanied by visual materials such as slides, films and transparencies.				
• Project- is a significant unit of problematic nature, planned and carried to completion by the learners in the natural manner and involving the use of physical materials to complete the unit of experience.				



• Laboratory/experimental- one way of teaching, that actively involves every student in the class in manipulating materials and simple equipment to find answers to questions and solve problems.				
• Problem solving- Refers to the process of removing difficulty through rational procedures involving analytical and reflective thinking.				
• Fieldtrip- it is an out of classroom activity whereby students study things in their natural settings.				
• Reading/study type- this methodology requires students to gather facts and information or solve problems by reading printed materials.				
• Games- These are activities or contests governed by sets of rules. People engage in games for recreation and to develop mental or physical skills.				
• Debate- this methodology requires one to talk or argue about something at length and in detail, especially as part of a formal exchange of opinion.				
• Others, please specify _____				

III. What are the factors that affect the learning of Science?

DIRECTION: Please check the number that corresponds to your answer

- 4-very much affect 3-much affect
2-fairly affect 1. no effect

Factors that affect the learning of Science	4	3	2	1
1.knowledge of the teacher				
2.complexity of the subject matter				
3.availability of textbooks				
4.in adequacy of the library facilities				
5. in adequacy of audio-visual room, equipment and facilities				
6.limited school site				
7.poor classroom conditions				
8.in adequacy of children's tables, chairs, lockers				
9.lack of manipulative materials				
10.lack of learning resource centers/corners				
11.inappropriate attitudes of the students				
12.lack of administrative support				
13. Others, please specify _____				



BIOGRAPHICAL SKETCH

The researcher turned 24 last December 9, 2006. She was born in Manila but grew up in Baguio City. Her father was a policeman and her mother stayed at home to take care of her four brothers. She is already married to Johndy and blessed with a son, John Jacob (5 years old). She is presently residing at JC 311 Balangcia Road, Km.5 Pico, La Trinidad, Benguet.

She took Bachelor of Secondary Education major in Science and Technology at Saint Louis University, Baguio City and took the Licensure Examination last August 14, 2005 and passed. She is presently enrolled at Benguet State University taking Master of Arts in Education major in Educational Administration and Supervision and her minor is Science and Technology.

Her working experience includes a tutorial at Touch International for a year and Pines City Colleges employed her as a Substitute teacher for two months.

