

JESUIT SECONDARY EDUCATION ASSOCIATION

FOUNDATIONS

*Four Hallmarks of Jesuit Pedagogy: Prelection, Reflection, Active Learning, Repetition**

By Ralph E. Metts, S.J.

A Class Using Ignatian Pedagogical Techniques

The purpose of this paper is to examine some of these basic characteristics of Jesuit Pedagogy in light of what current educational research is saying about good teaching and instructional theory.

The bell rings. You or a student leads the class in a brief prayer. The first thing on the agenda is an oral or written review of the previous night's homework (repetition). After this review is finished, you present an overview of the material to be covered during this class period (modified prelection). You begin your presentation of new material for fifteen or twenty minutes. After that you provide the students five to ten minutes of time to work with the new material with some type of study guide sheet (reflection). Following that you allow the students to ask you questions about anything that is not clear from your presentation and their work (active student learning). You follow this up with a series of questions for students to work on at their seats or at the board or in small groups (active

student learning). Next you present a brief review of the new material covered in this class, which highlights the major points you want the students to understand from this class (a short repetition). Then you spend five to ten minutes previewing with the students the homework assignment for tomorrow (traditional prelection). The bell rings and the students leave. If your classes follow any number of steps in the process briefly outlined above, you are employing some of the hallmarks of Jesuit Pedagogy. You will also be practicing many of the characteristics that research indicates are good teaching strategies.

This sample class scenario contains four essential characteristics of Jesuit Pedagogy: prelection,

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reflection, active involvement in the learning process, and repetition. The purpose of this paper is to examine some of these basic characteristics of Jesuit Pedagogy in light of what current educational research is saying about good teaching and instructional theory.

RELATIONSHIP OF THE FOUR HALLMARKS TO THE SPIRITUAL EXERCISES AND THE RATIO STUDIORUM

Go Forth and Teach: The Characteristics of Jesuit Education highlights the relationship between Jesuit Pedagogy as it is presented in the *Ratio Studiorum*¹ and the *Spiritual Exercises of St. Ignatius Loyola*:

There are analogies between methods of the *Exercises* and traditional Jesuit teaching methods, many of which were incorporated into the *Ratio Studiorum*:

- a. The “preludes” and “points” for prayer are the prelection of the course material to be covered; (GFT 160)

“Points” consist of briefly considering the material for the next day’s prayer before retiring so that the matter for prayer will be the last thought on one’s mind. The “preludes” occur at the start of a prayer period. First, one places oneself in God’s presence. Then one sets a context for prayer, which may be imagining and placing oneself at an event in Jesus’ life. Finally one asks for the grace one seeks from the period of prayer.

Go Forth and Teach continues its description of the relationship between the *Exercises* and Jesuit Pedagogy:

- b. The “repetition” of prayer becomes the mastery of course material through frequent and careful repetition of class work;
- c. The “application of the senses” (“sentir” for Ignatius) is found in the stress on the creative and the imaginative, in the stress on experience, motivation, appreciation and joy in learning. (GFT 160)

Repetition in the *Exercises* has two different forms. The first form of repetition is a review of a prayer period after it is completed. The purpose of this repetition is to review what happened during the time of prayer, to analyze what moved one deeply and what

had little, no, or negative effects. The second form of repetition in the *Exercises* consists of repeating prayer sessions that were very fruitful or resulted in little positive reaction. This form of repetition serves to help deepen further one’s fruitful prayer experiences and to re-examine why one experienced little or no reactions to a particular subject during prayer.

For Ignatius, each of these points was very important for fruitful prayer. The care and attention given to the preparation for prayer, the full involvement of the heart and mind in the prayer, and the repeating of both fruitful and challenging prayer periods all helped to lead the individual to a closer and deeper relationship with God. The *Ratio Studiorum* took each of these points and worked them into a Jesuit teaching methodology which stresses prelection or preparation, student reflection and active involvement in the learning process and frequent repetitions of the material learned. *Go Forth and Teach* further illustrates these points:

The pedagogy is to include analysis, repetition, active reflection, and synthesis; it should combine theoretical ideas with their applications. (GFT 162)

It is not the quantity of course material covered that is important but rather a solid, profound, and basic formation. (“Non multa, sed multum”.) (GFT 163)

PRELECTION

PRELECTION OF “PRELECTION”

From what you have read thus far, you may have some preliminary ideas about what prelection is. Take a moment now to reflect on these questions:

- From what I know, how would I define prelection?
- What educational purposes might prelection serve?
- In what ways is the idea of prelection present in current educational theory?
- Given my current understanding of prelection, what educational techniques that I already know seem similar to prelection?
- What is it I need to know about prelection to make it a useful tool for my teaching?
- When and how might I want to use prelection?

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You have just experienced a simple prelection designed to help you better understand the next section of this paper which discusses prelection.

DEFINITION AND DESCRIPTION

The five to ten minute preview of the next day's homework that occurred in the sample class is a prelection. The brief overview that occurred at the start of the sample class is a modified prelection technique. Prelection is, as its prefix and root indicate, a pre-reading or surveying before the actual process of reading or studying. *The Manual for Jesuit High School Administrators* provides the following description of prelection:

The most characteristic of all Jesuit techniques is the prelection, "... the preview, conducted by the teacher with the active cooperation of the class, of every class assignment." It should be clearly understood that the prelection is not a lecture; it is essentially a co-operative effort which elicits the interested activity of the students. Moreover, the use of the prelection is not confined to the classics; it is adaptable to any subject matter. (MANUAL p. 173)

PURPOSES OF PRELECTION

Fr. Allan Farrell in the *Jesuit Educational Quarterly* (March, 1943);² lists some of the aims for a prelection:

- To awaken the interest of the student in the subject matter;
- To set precise and attainable objectives for the assignment;
- To point out more important or complicated phases of study;
- To suggest problems to be studied for review or discussion or judgment.

PRELECTION: A TOOL FOR PROMOTING INTEREST IN DOING HOMEWORK

Prelection is an excellent teaching technique to confront the increasing problem of lack of interest in and lack of production of homework frequently cited by teachers today. As Fr. Farrell states, "It gives the student a start on private study, and, thus, almost automatically provides motivation for at least some effort and interest in study." By posing questions that relate the material to previous learnings, by pointing out challenging aspects of the homework assignment, and by suggesting a study method for approaching the

material, the prelection begins the process of doing that night's homework during class time. Once the homework process has been begun during class time, many students find it easier to enter into the homework process later. Students discover that beginning homework is not something new, but a continuation of a process already underway. Because of this advanced start provided by prelection, a strong probability exists that the interest and motivation for doing homework, one of the most essential components in the task of doing homework, will be increased for the student. When the prelection involves some presuppositional language, such as: "When you are doing your homework tonight," or "While you are studying this evening, you will first notice that" (notice all the presuppositions in these statements), it becomes a powerful tool for helping students enter more fully into doing homework.

Prelection also helps to arouse students' interest in the subject matter. Prelection can set up points or questions that will intrigue students or arouse their interest during their private study. Fr. Farrell comments upon this aim of prelection, "The teacher's infallible yardstick in projecting the prelection is: what, in view of my knowledge and appreciation of this particular subject matter, and consequently in view of my own enthusiasm for it, must I do, first to arouse the student's interest in it, secondly to insure use by the students of an intellectual method (the right way of coming to grips with a subject) in studying it"

Using metaphor during a prelection will also help encourage greater interest in the subject matter. Metaphor is primarily a right hemisphere educational technique that fosters creativity and helps the student integrate new material with old. By placing some questions in the prelection which start students thinking metaphorically, a teacher begins to involve students actively in the homework assignment. For example, you might introduce a history lesson on the structure of a foreign government by asking students to compare their school government structure with the government being studied.³

PRELECTION: A TOOL FOR PROMOTING STUDY SKILLS AND THINKING SKILLS

Prelection is an excellent way to help develop a wider repertoire of study skills and higher level thinking skills. During the prelection the teacher can focus the



students on what aspect of the information he or she wants the student to know. As Fr. Farrell notes, “It prepares the student to obtain from every subject and every assignment not only intellectual content but also an intellectual method.... In the hands of a practiced teacher, it is a constant and fruitful object-lesson to the pupil of the art of studying, since he or she will have daily contact with a mature and trained mind communicating its own planned method of mastering varied subject matter.”

The prelection can be varied from day to day and is adaptable to many different situations. Fr. Farrell comments, “It is adaptable to any subject matter (languages, history, science, mathematics, philosophy),⁴ and can be used with slow or fast moving classes.” Fr. Farrell further urges, “Adapt the prelection to the grade of the class and to the particular needs of the class from day to day and from week to week.” A prelection at the end of one class may emphasize how to read for basic facts. Later in the same week the prelection might combine factual reading with one or two analysis or synthesis questions to promote higher level thinking skills. On another day the prelection might include some questioning about how the material links with what has gone before. Another possibility is for the student to hypothesize about what will follow in the next section of the course. A prelection might also suggest to students questions about applying what is being learned to their lives.

SOME GENERAL PRINCIPLES FOR USING PRELECTION

In addition, Fr. Farrell sets down some guidelines for using prelection:

- The prelection demands careful preparation of the teacher. It will be practically useless if given *impromptu*.
- The prelection must be selective, its norm must be not *multa* (many things) but *multum* (a few things done thoroughly).
- The tendency to view the time spent in giving the prelection as wasted or as wrested from other more important classroom duties mistakes the fundamental purposes of education. Students themselves almost unanimously condemn the pure lecture system, especially on the high school and

junior-college level. The time of prelection is the teacher’s opportunity for forming the studious habits of pupils, for teaching intellectual method, for giving intellectual guidance, for coaching, for motivating, for setting the human capacities into action.

- If the prelection is to be fully effective for students, they should be urged to give close attention and not attempt to take down what the teacher is saying.

The last point deserves some comment. The traditional prelection was done entirely in the auditory mode. Only when the prelection finished were students permitted to take up a pen or pencil and jot some notes to guide their homework. If the prelection is done in this traditional manner, it can be used as a tool to help develop stronger auditory learning skills for students. Most students will want to try to remember helps and hints for the night’s homework. One caution needs to be added to using this traditional type of auditory prelection. Research indicates roughly twenty percent of a typical class are auditory learners. For the remaining eighty percent who are visual and physical learners, some modifications may have to be made in the traditional auditory use of the prelection so that the non-auditory learners will have the information they need for that night’s assignment.⁵ This might be accomplished by simply having key words written on the board or even a brief one or two word schematic of the prelection available for the students where they can fill in the ideas presented orally immediately after the completion of the prelection.

PRELECTION: ITS RELATIONSHIP WITH CURRENT EDUCATIONAL THEORY

Donald P. Kauchak and Paul D. Eggen in *Learning and Teaching*⁶ comment in general on the importance of some type of overview or prelection for successful teaching and learning:

A well thought-out introductory overview is essential to the success of a lecture recitation lesson. If done well, the integrated body of knowledge is presented in a coherent, learnable piece of information with a logical beginning and end, an internal organization, and linkages to what students already know. When done ineffectively,

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the lesson becomes a garbled set of mini-lessons with no connecting theme.⁷ (LEARNING AND TEACHING, p. 299)

While their comment applies primarily to the structuring of a class, the same can be said for the structuring of homework assignments. Many times assignments are given with no preview of any kind. As a result, students do not have clear expectations about what they need to learn from the assignment. The clearer the focus of an assignment, the more the probability increases that students will profit from the assignment.

A number of current educational theories closely resemble the Ignatian idea of prelection and certainly can be modified to be used as prelections.

ADVANCE ORGANIZER AND PRELECTION

David Ausubel⁸ talks about the importance of advance organizers for facilitating cognitive development. Bruce Joyce and Marsha Weil in *Models of Teaching*⁹ provide a good summary of David Ausubel's theory of advance organizer:

Advance organizers are the primary means of strengthening cognitive structures and enhancing retention of new information. Ausubel describes advance organizers as introductory material presented ahead of the learning task and at a higher level of abstraction and inclusiveness than the learning task itself. Its purpose is to explain, integrate, and inter-relate the material in the learning task with previously learned material (and to help the learner discriminate the new material from the previously learned material) (MODELS, p. 148). The most effective organizers are those that use concepts, terms and propositions that are familiar to the learner as well as appropriate illustrations and analogies. (MODELS, pp. 76-77)

This description of an advance organizer clearly has the same goals as the traditional prelection of Jesuit Pedagogy. As Kauchak and Eggen note, "Advance organizers are effective for a number of reasons: they 1) focus student attention on the topic at hand, 2) inform them where the lesson is going, 3) relate new material to the content already understood, and 4) provide structure for

the subsequent lesson." (LEARNING AND TEACHING, p. 77)

If you look back at the prelection of prelection, you will find a number of questions that follow the characteristics of an advance organizer. Notice that you are asked first to think about prelection — focusing of attention. Then you are asked to relate the term prelection to educational theory and educational techniques that you already know. Finally, the questions move in a definite order paralleling the order of presentation in this paper.

Both the brief preview at the beginning of class and the prelection of homework can follow the format of an advance organizer.

ANTICIPATORY SET AND PRELECTION

Madeline Hunter's anticipatory set¹⁰ is much like Ausubel's advance organizer:

Even when you have to sacrifice some beginning prime time to other functions, you should take advantage of the beginning of your class to create an anticipatory set in your students which will take their minds off other things and focus their attention on today's content. An anticipatory set also can hook into student's past knowledge and trigger a memory of some practice which will facilitate today's learning. In addition, students' responses may give you important diagnostic information about the knowledge or skills already possessed which are prerequisite to achievement of new learning: their cognitive, affective, or psychomotor "entry behavior."...The variety of effective anticipatory sets is limited only by your creativity plus your having determined with reasonable precision the objective of today's class. (MASTERY TEACHING, pp. 28-29)

The anticipatory set can have a number of forms and is used to arouse the students' interest in the material to be learned. One way of introducing a lesson is to ask a series of open-ended or rhetorical questions about the subject matter. Another method is to relate the material to the real world in which the students live. A sample anticipatory set for this section on prelection is: "How is this discussion of prelection related to other educational learning theory and teaching techniques



that you already know?” You will notice that as you read this question your mind immediately begins to focus on how this material relates to what you already know.

The anticipatory set may lend itself better to the introduction at the beginning of a lesson (modified prelection) than to a homework prelection, but certainly could be adapted for use as a homework prelection.

WHOLE BRAIN LEARNING AND PRELECTION

Current educational research has become increasingly aware of the function of both the left and right hemispheres in the learning process. Much of what occurs in the traditional classroom primarily involves the left hemisphere. Right hemisphere students learn whole to part, rather than part to whole, which is a left hemisphere learning style. Right hemisphere students read the end of a book or a chapter first so that they will know what happens before they begin reading. With a thorough prelection of a section of material, a student who learns holistically will be given some initial clues to where the pieces fit together, because he or she will have a sense of the complete picture. With that knowledge, he or she will know how to integrate the various parts into the total picture. The brief overview at the beginning of the sample class is a modified prelection technique and one which greatly assists those students who learn whole to part.

PRELECTION: TWO CURRENT EDUCATIONAL TECHNIQUES

SQ3R AND PRELECTION

The SQ3R Technique¹¹ (Survey, Question, Read, Restate and Review) is a basic methodology for reading and studying textbooks. It has been modified and changed by a number of people so that it is also known as the PQ3R or PQ4R.

The first two steps, Surveying or Previewing and Questioning, are techniques that can be aptly used in prelection. Research has shown that previewing before reading can help increase reading comprehension by as much as 75%. There are many ways to preview or survey and usually a good previewing will include the second step of the SQ3R — questioning. A prelection that uses a previewing and questioning methodology

for a reading assignment may focus on looking over a section to be read by:

- a. Looking at all the boldface titles and subtitles. Looking at any words in italics.
- b. Using the pictures to see if they give some idea of what the section is about.
- c. Reading the first sentence of each paragraph.

The questioning can be added by turning boldface titles and italics into questions with the suggestion that the student should try to answer those questions as he or she reads. The following 7-W and 1-H Questions can also be used as a general pattern for questions to keep in mind while prelecting a lesson: WHO, WHAT, WHERE, WHEN, WHY, WHAT WERE THE CAUSES, WHAT WERE THE RESULTS, HOW. Previewing, combined with questioning, leads to active reading rather than passive reading. The more active the person is in the reading process the greater comprehension and understanding.

STRUCTURED OVERVIEW AND PRELECTION

A Structured Overview¹² is another reading technique that can serve as a prelection of a homework assignment. The purposes of a structured overview are to:

- 1. Provide a logical means of pre-teaching the technical vocabulary of a content chapter;
- 2. Present the students with an “idea framework” designed to show important relationships between content vocabulary;
- 3. Help teachers clarify teaching goals.

In a structured overview, the teacher presents a picture or a schematic diagram of important words and concepts to be discussed in the chapter. This picture or schematic diagram serves as a point of reference for the students as they proceed through the chapter. The following table¹³ is a structured overview that could be used to introduce prelection in a class setting.

PRELECTION ¹³			
Definition	Purposes of	Relationship to Current Educational Theories	Relationship to Current Educational Techniques
Preview	Interest in Homework	Advance Organizer	SQ3R
Surveying	Study skills	Anticipatory Set	Structured Overview
Questioning	Thinking skills	Whole brain Learning	

Notice all the specialized educational vocabulary in the table. During a prelection using this structured overview, many of the terms would need some initial explanation. Variety could be added to the prelection by defining some terms and suggesting to the students to figure out how another term is similar or different to an already defined one. In some instances one may suggest a meaning for a term, such as “advance organizer,” and ask the students to decide if the suggested meaning is satisfactory or not.

Both the prelection of homework and the overview at the beginning of a class can follow this structured overview format.

REFLECTION AND ACTIVE LEARNING IN THE CLASSROOM

RELECTION ON “REFLECTION AND ACTIVE LEARNING”

Before beginning the section on reflection and active learning, take a few moments to reflect on the following questions:

- What do I understand these two terms to mean?
- What do these two terms mean in the context of Jesuit Education?
- Were do I use active learning in the classroom?
- What techniques do I use to promote active learning?
- When do I use reflection in the classroom?
- What techniques do I use to promote reflection in the classroom?
- What would I like to learn about the Ignatian sense of active learning and reflection that would be applicable to my classes?

DEFINITIONS AND DESCRIPTIONS

In the sample class, the time spent with the study guide was a reflection period for the student. Working on the study guide sheet, eliciting questions from the students as a result of that work, and the work in small groups all involved active student learning.

Reflection and active learning are essential steps in an Ignatian educational process that starts with careful preparation (prelection), continues by active participation in the subject, and concludes with time spent reviewing what has occurred (repetition). These

two hallmarks of Jesuit Pedagogy go hand in hand and come directly from Ignatius and his *Spiritual Exercises*. When one is making the *Spiritual Exercises*, one must be actively involved in the process. The bulk of that active involvement is time spent in prayer and reflection. These same principles became part of the process of Ignatian education as *Go Forth and Teach* stresses:

The active role of the person making the *Exercises* is the model for the active role of the student in personal study, personal discovery and creativity. (GFT 156).

Growth in the maturity and independence that are necessary for growth in freedom depends on *active participation* rather than passive reception. Important steps toward this active participation include *personal study, opportunities for personal discovery and creativity, and an attitude of reflection*. The task of the teacher is to help each student to become an independent learner, to assume the responsibility for his or her own education. (GFT 45)

Current educational theory also emphasizes the importance of active involvement in the learning process. William Glasser¹⁴ illustrates the importance of active involvement in the learning process with the following statements:

WE LEARN...

- 10% of what we read;
- 20% of what we hear;
- 30% of what we see;
- 50% of what we see and hear;
- 70% of what is discussed with others;
- 80% of what we experience personally;
- 95% of what we teach.

ACTIVE LEARNING

While it is beyond the scope of this paper to recount the many techniques available to help students become more active in the learning process, some current educational techniques that encourage greater activity on the part of the student deserve comment.

Joyce and Weil, in *Models of Teaching*, offer some general guidelines for promoting active learning:



Active learning can be promoted by:

1. asking students to describe how the new material relates to a single aspect of their existing knowledge;
2. asking students for additional examples of the concept or propositions in the learning material;
3. asking students to verbalize the essence of the material, using their own terminology and frame of reference;
4. asking students to examine the material from alternate points of view; and
5. relating the material to contradictory material, experience, or knowledge. (MODELS OF TEACHING, p. 81)

ACTIVE LEARNING THROUGH EFFECTIVE QUESTIONING STRATEGIES

While Joyce and Weil's general guidelines provide some suggestions for structuring active learning, another way to promote active learning on the part of the students is to use effective questioning strategies. Kauchak and Eggen, in *Learning and Teaching*, conclude their introduction to effective questioning (for a complete discussion about classroom questioning, see Chapter 4) thus:

Active participation means that instructional activities provide students with an opportunity to learn and practice new content and skills. When actively engaged in learning, students encounter questions and problems and focus their attention on solving and answering these tasks. Question and answer sessions in which teachers consciously involve all the students in the process are characterized by high involvement and active participation rates (LEARNING AND TEACHING, p. 104).

While one characteristic of effective questioning is to involve as many students as possible, other characteristics discovered by research are important for effective classroom questioning. Kauchak and Eggen note some of these basic characteristics:

1. Teachers who question effectively are flexible and responsible to their students.
2. Teachers relate the questions to a clearly established goal for their class.
3. Teachers monitor their own language as they

question and watch the class for both verbal and non verbal responses.

4. Teachers use a variety of questions (open ended, prompting, and repetitive) and have an equitable distribution of questions among the class. (LEARNING AND TEACHING, pp. 114-115)

Commenting further upon open-ended questions, Kauchak and Eggen offer some practical advice about how to ask open-ended questions. Open-ended questions which are directed to the whole class without specifying a particular student by name, help keep attention focused for all members of the class. Questions which include the student's name at the beginning tend to let the rest of the class off the hook because the use of a particular name suggests that he or she is the only person who will be responsible for the answer. Questions that put the name of the student at the end of the question tend to focus more of the class' attention than one with the student's name at the beginning. Questions with the student's name at the end, however, do not focus the attention of the whole class as well as the open-ended question without any particular student's name.

Another important technique for developing effective questioning skills discovered through research is the use of a longer *wait time* for answers to questions. Research conducted by Rowe¹⁵ found that the typical wait time is less than one second for students to answer a teacher's question. In further research it was discovered that matching wait time to the difficulty of the question, but always at least a 3 second wait time, resulted in:

1. smoother and more focused lessons;
2. teachers became more sensitive to students' participation and had a more equitable distribution of questions among the entire class;
3. the length and quality of student responses increased;
4. failures to respond were reduced and the number of disciplinary interruptions decreased;
5. increased wait time resulted in increased performance on subsequent tests in classrooms ranging from kindergarten through college. (LEARNING AND TEACHING, pp.130- 131).

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All the research summarized here certainly indicates that, by becoming a more effective questioner, a teacher can enhance the active learning of students.

ACTIVE LEARNING AND COOPERATIVE LEARNING

Cooperative learning¹⁶ is a learning technique involving students working together in small groups, usually groups of three. Many times the groups are constructed to include a mix of abilities in a particular area. In the true cooperative learning model, the grade is based upon the cooperative effort of all three participants. It is an excellent strategy for actively involving students in the learning process and in the process of learning how to learn and sharing that knowledge with others.¹⁷

Kauchak and Eggen comment upon the positive effects of cooperative learning:

Students in these groups evidenced increased motivation, greater satisfaction with learning, and more positive attitudes toward school and specific subject matter being studied. There were interpersonal and social benefits as well. Participants expressed more interpersonal liking, trust, and a sense of being accepted, and there was increased mutual concern and cohesiveness among the participants. (LEARNING AND TEACHING, p. 391)

REFLECTION

Reflection might be characterized as a principal tool for advancing active learning. The stress on reflection in *Go Forth and Teach* is very evident. The use of reflection as a tool in Jesuit education is cited eleven separate times (8, 15, 17, 32, 45, 80, 90, 143, 145, 147, and 162). An attitude of reflection and the time for reflection are clearly essential components of Ignatian education. Reflection is also being discussed widely in education today. The March 1991 edition of *Educational Leadership*,¹⁸ entitled "The Reflective Educator," contains many excellent articles on the role of reflection in education today.

Joyce and Weil, in *Models of Teaching*, in their discussion of the Group Investigation model of teaching comment upon the importance of reflection in the educational process in a vein very similar to passages in *Go Forth and Teach*:

Thus, individuals' ways of reflecting on reality are what make their world comprehensible to them

and give them personal and social meaning. Therefore, the quality of an individual's ability to reflect on experience becomes a critical factor in determining the quality of the world he or she will construct about him or her. Someone who is insensitive to much of his or her experience and does not reflect on it will have a far less richly constructed world than someone who takes in a good deal of experience and reflects fully on it. It becomes critical to education to sensitize the individual to many aspects of his or her physical and social environment and to increase his or her capacity to reflect on the environment. (MODELS OF TEACHING, p. 226)

Perhaps, the greatest challenge to developing an attitude of reflection is simply to find the time during class time to provide the students the opportunity for reflection. Doing so is being true to the Ignatian spirit of Jesuit Pedagogy. Reflection can be fostered by such materials as study guides, which follow up on a presentation and challenge the student to relate the material not only to the course but to his or her life.

REFLECTION THROUGH JOURNALING

Journaling is one way to provide the student an opportunity for reflection. Journals which focus on such basic questions as: "What did I learn during this class period?" or "Where do I find myself confused or uncertain about what I have been dealing with?" can help develop a more reflective attitude in students. The five general principles for active learning cited from Joyce and Weil earlier in this paper may serve as good initial journaling questions for students.

REFLECTION THROUGH SILENCE

Parker Palmer in, *To Know as We Are Known*,¹⁹ presents one unusual and challenging way to promote reflection through periods of silence in the classroom:

I also use periods of silence in the middle of a class, especially in an open discussion when the words start to tumble out upon each other and the problem we are trying to unravel is getting more tangled. I try to help my students learn how to spot those moments and settle into a time of quiet reflection in which the knots might come untied. We need to abandon the notion that "nothing is happening" when it is silent, to see how much new clarity a silence often brings. (TO KNOW, p. 80)



One can also begin a class with a silent period to reflect about what were the major points learned or the important new learnings in the last class. One can conclude a class with time to write a brief summary of the material learned. Both of these foster an attitude of reflection and active involvement in the learning process.

4MAT: A PEDAGOGICAL SYSTEM OF REFLECTION AND ACTIVE LEARNING

One current pedagogical system deserves some special comment. Bernice McCarthy's *The 4Mat System*²⁰ presents a unified system that encompasses not only individual learning styles with right and left hemisphere learning techniques, but also incorporates regular periods of reflection and activity. The 4Mat system moves in sequential fashion from Concrete Experience to Reflective Observation to Abstract Conceptualization to Active Experimentation. With each of these four areas there are two activities, one for the right hemisphere and one for the left. The following is a brief summary of the basic steps of the 4Mat system:

One: Integrating Experience with the Self
(Concrete Experience)

1. Create a concrete experience.
(Right Mode).
2. Reflect on experience, analyze it.
(Left Mode).

Two: Concept Formulation
(Reflective Observation)

3. Integrate experience and reflections into concepts. (Right Mode).
4. Examine and formulate concepts.
(Left Mode).

Three: Practice and Personalization
(Abstract Conceptualization)

5. Work on defined concepts and givens
(Left Mode).
6. "Mess around" with givens. Add something of themselves. (Right Mode).

Four: Integrating Application and Experience
(Active Experimentation)

7. Analyze application, judge results of experimentation. (Left Mode).
8. Apply learning personally and share with others. (Right Mode).

Notice that the learning process begins with the concrete experiential life of the students. As the student moves sequentially through each of the sections, there is a pattern of active involvement in the learning process as well as time for reflection about what is being learned. The learning process always returns at the end to the application to the real life situation with the sharing of learning with others. The whole cycle of the 4Mat approach is precisely the cycle that one undertakes in the *Spiritual Exercises* of St. Ignatius — the movement from experience through prayer and active reflection back to applying what was learned to one's life. If followed regularly, 4Mat certainly helps a teacher move students through a learning cycle, which closely parallels Ignatian prayer and Jesuit pedagogy.

REPETITION

PRELECTION OF "REPETITION"

Take a few moments to reflect on the following questions as a prelection before a discussion of repetition, another hallmark of Jesuit pedagogy:

- From what I currently know, what do I understand repetition to be?
- How is repetition the same as or different from review?
- Is Ignatian repetition the same as or different from review?
- What is the purpose of repetition?
- What educational techniques work well in repetition?
- What does teaching students to think visually mean?
- What educational techniques promote visual thinking?
- What is the relationship between higher level thinking skills and repetition?
- How do I currently use repetition in my teaching?
- Is there anything I would like to learn about repetition that would be applicable to my classroom?

DEFINITION AND DESCRIPTION

Prelection begins the learning process and sets the stage for the active involvement of the learner in the process. Repetition brings about closure in the learning process and helps the student to master the material completely. The oral or written review at the beginning of the class and the summary at the end of

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the class are two examples of repetition. *The Manual for Jesuit High School Administrators* discusses the importance of repetition in Jesuit Education:

This was one of the most characteristic and most important educational principles of Jesuit teaching. The purposes of repetition are to fix knowledge that has been acquired, to organize knowledge in meaningful relationships, and to develop intellectual and volitional habits.

In the *Ratio Studiorum* there were five types of repetition: a brief review immediately after the prelection, covering the main points offered; a thorough test of home study in the following class period; and three ever-widening circles of review — at the end of each week, each month, and each year's work. Although drill is important, especially in learning the elements of a subject like forms, vocabulary, mathematical processes, and the like, drill is not listed as repetition. *Usually repetition implies a broader view of the subject, a new perspective of the relation of the parts to the whole, a discovery of greater depth or breadth.* (MANUAL, p. 173)

Jesuit educator, Charles Costello, S.J., comments further upon the importance of repetition in Ignatian education in "Reflection on Jesuit Pedagogy" (unpublished paper):

The second practice is not unlike reflection in its outcomes. It is *repetition*, a practice in *The Spiritual Exercises*, which has lost some of its power in the way it has been applied to Ignatian education. It was never intended to be a 'going back over' all old material, but rather a returning to those points or aspects of material which brought out the deeper feelings and responses, and concentrating on them anew, 'savoring' the material more deeply. If daily, weekly or yearly repetitions of learning are practiced, it should never be recoupage of all the matter but special concentration on aspects of the course, which created most excitement, caused most confusion or raised most questions. The benefit to the students' progress in mastery of the subject and reinforcing interest in it are obvious in this way of repetition.

PURPOSES OF REPETITION

Notice that the emphasis in all the comments about Ignatian repetition is not on simply reviewing the material, but always reviewing with the idea of new learning, discovery and deeper integration. Repetition is not a simple repeating of what has been learned, but rather a time to integrate and analyze what has already been learned. For some students it is a time to integrate facts that were not understood or understood imperfectly during the first learning. For other students it is a time for even greater analysis and synthesis of the material already known. Like prelection, repetition affords an opportunity to promote higher level thinking skills and to further augment students' reflection about their learnings.

This process of repetition best begins at the very end of a class with a brief review of what had been covered during that day. Kauchak and Eggen note the importance of such a review:

One characteristic of all good teaching is some attempt by the teacher to pull the lesson together at the end.... A powerful way to conclude is to refer the students back to the organization scheme that was introduced at the beginning of the lesson. The spatial organizational devices that have proved so useful so far have one final function. They provide a visual means of pulling the lesson together at the end.... Because they are visual, these organizational devices provide an economical and alternate (visual) way of remembering the lesson's content. Research on imagery (Paivio, 1971) as well as on learning styles (Dunn and Dunn, 1978) supports the idea of visual summarizing devices. (LEARNING AND TEACHING, pp. 303-304)

REPETITION AND CURRENT TEACHING TECHNIQUES

Some recent developments in learning theory tie nicely into the Ignatian concept of repetition. What follows are some suggestions from three areas of current educational research and an attempt to illustrate how they might be used to implement the Ignatian concept of repetition.

WHOLE BRAIN LEARNING AND REPETITION

Much of what happens in the traditional Jesuit classroom focuses on logical, sequential, analytical



reasoning processes of the mind. These are characteristics of left hemisphere processing. Repetition in the Ignatian sense of returning to the material with a new look, a savoring and a deeper understanding can be enhanced by using some right hemisphere processing skills. Right hemisphere processing skills are analogical, simultaneous, holistic, visual and spatial. These are precisely the skills that Ignatius talks about when he uses the word *sentir* in the application of senses during prayer. As *Go Forth and Teach* states:

The “application of the senses” (*“sentir”* for Ignatius) is found in the stress on the creative and the imaginative, in the stress on experience, motivation, appreciation and joy in learning (GFT 160).

Furthermore, research has shown that people who are considered very creative first process in the right hemisphere (holistically). After processing with the right hemisphere, creative individuals then employ the left hemisphere to break “the whole” down into parts and pieces. Many times the creative person can then use these parts and pieces of the whole to share ideas and insights in a comprehensible way with other people.

Linda Verlee Williams, in *Teaching for the Two-Sided Mind*, lists five teaching techniques that involve right hemisphere processing²¹ Williams considers five areas of right hemisphere processing to incorporate into the learning process: Visual Thinking, Metaphor, Fantasy, Multi-Sensory Learning, and Direct Experience. It is beyond the scope of this paper to analyze all these areas, but a few deserve some comment because they readily lend themselves to the Ignatian process of repetition.

VISUAL THINKING AND REPETITION

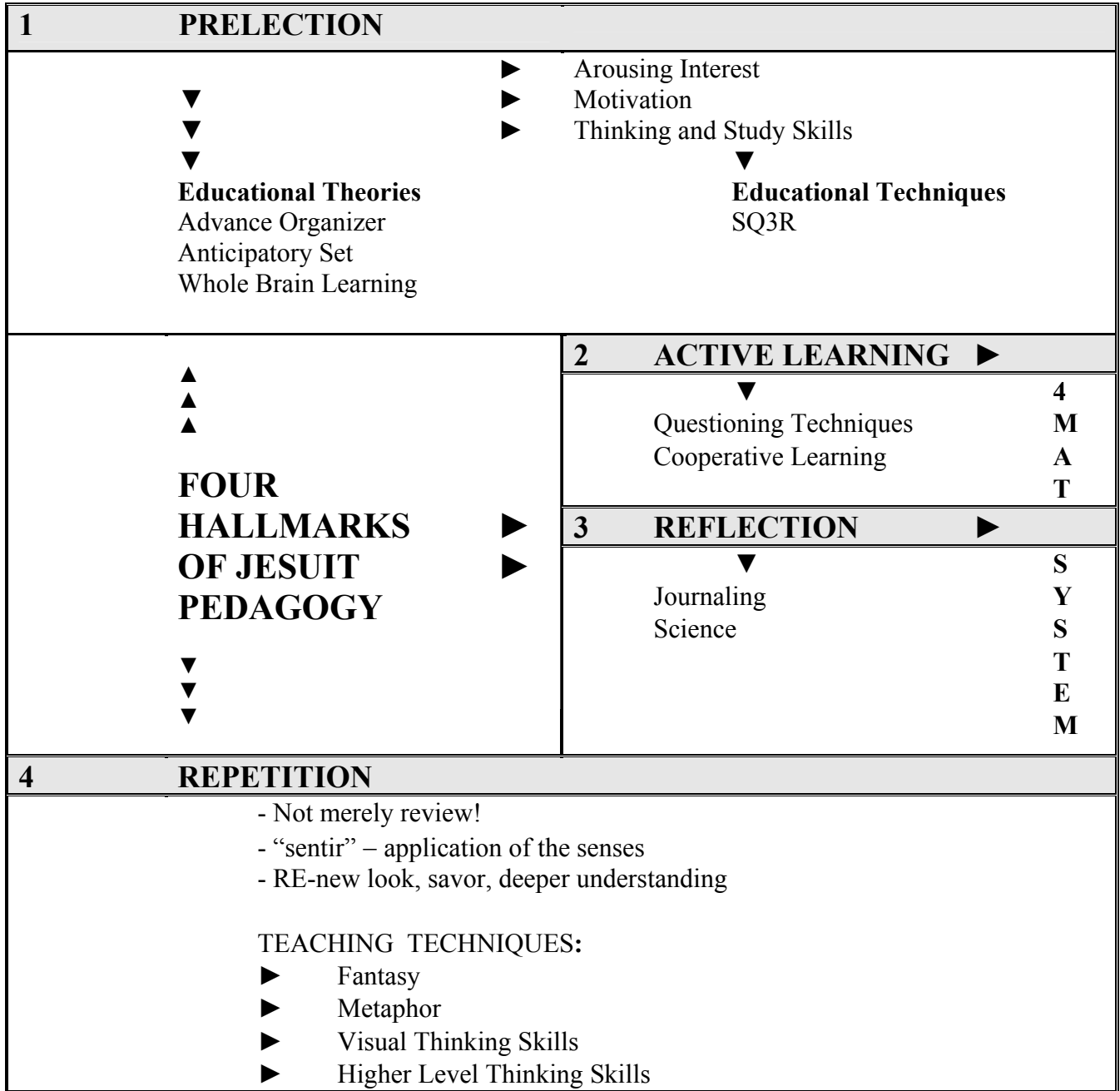
Visual thinking is a powerful right hemisphere learning technique and an excellent technique to use for Ignatian repetition. Neuro-Linguistic Programming (NLP) has found that the students who achieve most easily in school are those who incorporate both auditory and visual material into internal visual representations during the learning process.²² Those students who may experience some learning struggles or difficulties are usually more auditory and/or kinesthetic (learn by doing) learners. Thus, it is important to teach students how to visualize while

they learn. Repetition offers a chance to have students use their visualization powers to further understand and master the subject matter.

Visual thinking will be particularly valuable to the non-auditory learners especially if most of the presentation has taken place through a lecture format. How can the material be presented graphically — charts, graphs, and diagrams? Can the student make a mind map²³ of the material? Figure 1 contains a sample mind map of this paper. A mind map is a non-traditional outline format. It stresses association and connection of ideas rather than logical sequences of thought. A person begins a mind map by placing the main idea anywhere on a page. With the main idea as a starting point, one then recalls a subdivision of the main topic, placing it on the page so as to show its connection with the main idea. The person then proceeds to write down everything that comes to mind as particularly important to that one subdivision of the main topic, using line drawings and other devices to map the interrelationship of ideas. After the subdivision is exhausted, one begins a new line of thought, in similar fashion, with another subdivision of the main topic. In this mind map each box represents one complete subdivision related to the main topic of the four hallmarks of Jesuit pedagogy. The boxes in the sample mind map could just as easily be circles or a series of arrows from the main topic. Mind maps are an excellent prewriting technique and a good way to summarize chapters of a textbook. Many times when a student compares his or her mind map summarizing a chapter of a textbook, he or she will quickly discover the major points that have been overlooked and will know where further study is required.

Artistic students may profit from reviewing material by presenting it in some artistic way. Drawings, sketches, pictures or mandalas are all possible ways to incorporate more of the right hemisphere into the reviewing process.

FIGURE 1: SAMPLE MIND MAP





One visualization learning strategy devised by NLP comes from modeling good spellers who rely primarily on visual images of the words. This strategy can be used for any material, which must be memorized and can be adapted according to the material being learned. The basic steps in this strategy are:

- **PICTURE THE WORD.** Look at the word to be memorized. Take a picture of the word without saying anything aloud or to yourself. Trace over the letters with your eyes. The student may wish to make the letters or syllables that present some difficulty a favorite COLOR and/or DIFFERENT SIZES and/or SHAPES. Make sure the student is confident about knowing the word — that he or she has a mental picture of it and feels it is correct. I do this by asking the student if he or she can visualize the word and if it is correct. It is sometimes helpful to hold up the cue word above the student's eyes so that the student must raise his or her head slightly to look it. By doing this you are forcing the student to process in a visual area.²⁴
- **PROJECT WORD ON THE CEILING.** Have the student project the word on the ceiling. You are forcing the student's eyes into the visual remembered field. While the student is looking at the remembered image of the word, have the student spell it. Now have him or her spell it backwards! This assures that the student is relying on a visual remembered image and not an auditory strategy. Make sure that the student keeps his or her eyes up while spelling the word. If the student's eyes begin to move horizontally across the midline of the eyes, the student is processing auditorially. Do not let the student use the auditory system during this visual learning process.
- **REPEAT IF NECESSARY.** If there are any errors in the process, repeat the steps.
- **ADDING A WRITING COMPONENT.** You can have the student write the word while spelling it both forwards and backwards to add more kinesthetic input.²⁵

All of these visual-thinking strategies provide

additional ways to conduct a review. They all bring more of the imaginative and the creative right hemisphere into the learning process and in so doing augment the learning and achieve the goal of Ignatian repetition — a new savoring and a deeper understanding of the material learned.

METAPHOR AND REPETITION

Metaphor is an equally powerful right hemisphere learning technique. In the prelection section of this paper, metaphor was introduced as a technique to use during prelection for arousing motivation and interest. Metaphors during review take on a slightly different orientation. While introductory metaphors are usually teacher generated, metaphors used in repetition will be more beneficial if they are student generated. What do you already know that is like ____? How is this like ____? How is it different from ____? By using metaphors, a teacher helps the student to integrate the material into many different aspects of his or her life. Metaphor is another technique to help accomplish what Ignatius describes as the deeper understanding and fuller integration of the material already learned.

FANTASY AND REPETITION

Fantasy is another right hemisphere technique that can be used in repetition to help students approach the material from a new perspective. Linda Williams comments upon the importance of teaching students to use fantasy:

While fantasy is a valuable teaching tool, it is also a thinking skill that every student should be taught to use. Beyond being a pleasant and motivating experience, the ability to transcend physical limitations through the mind, to project oneself into something and explore it mentally or to imagine oneself becoming the thing is an extremely important skill for problem solving and other creative endeavors. One of the more dramatic examples of the power of this type of thinking, Albert Einstein's fantasy of himself riding a ray of light, played an important role in the discovery of the theory of relativity. Any lesson that employs fantasy addresses at least two instructional objectives — the mastery of subject matter and the mastery of an important thinking skill.

The power of fantasy is that it offers the fruits of right hemisphere thinking and thus provides us

with the resources of both sides of the brain. If you ask students to think about a noun, they will respond with information from the left hemisphere. If you ask them to become a noun, they will call up the insights of the right hemisphere. (TEACHING FOR THE TWO-SIDED MIND, p. 117)

Williams provides some specific recommendations about how to use fantasy in the repetition process:

Fantasies used for review differ from other types in several ways. First, the language is specific and includes labels and terms... Be very specific about the purpose of the fantasy. Tell the students before you do it that it is a way of helping them remember and retain information for the exam. At the time of the exam remind them that the experiences and images from their fantasies can help them remember information for the test and encourage them to use these images (TEACHING FOR THE TWO-SIDED MIND, p. 125).

Fantasy is a very fitting process for use in the Ignatian sense of repetition because it does involve the imagination and can lead to a fuller understanding of the material.

THEORY OF MULTIPLE INTELLIGENCES AND REPETITION

Repetition provides an opportunity to tap into other intelligences beside the ones directly covered by a particular subject. Howard Gardner, in *Frames of Minds*,²⁶ posits seven types of intelligences: Linguistic, Logical-Mathematical, Musical, Spatial, Bodily-Kinesthetic, Interpersonal and Intrapersonal Intelligence. Gardner suggests that each one of us has varying degrees of these seven intelligences. In schools using Gardner's theory, grading is done with a portfolio approach. As much as possible, each subject area tries to tap into the seven intelligences so that the grade is determined by all the intelligence, not just the one or two intelligences tapped by a subject area.²⁷

Repetition in the Ignatian sense can be an apt time to involve little used intelligences in the learning process. Certain subjects such as math or English, which by their nature tend to focus primarily on one intelligence, can involve other intelligences during a repetition. The inclusion of as many of the seven intelligences as possible, and in particular, the use of a

strong intelligence not tapped by a particular subject, will lead to greater understanding and retention of that subject. Additionally, the use of as many intelligences as possible during a review will foster greater creativity on the part of the students. Involving multiple intelligences in the learning process is the same process that Ignatius called the "application of senses."

HIGHER LEVEL THINKING SKILLS AND REPETITION

Another way to use repetition effectively is to try to focus the repetition process upon higher level thinking skills. The following brief hierarchy of thinking skills moves from lower level skills to higher level thinking skills:

- MEMORY — recall, define, quote, identify, reproduce, recognize, name.
- TRANSLATION — represent, symbolize, draw, retell, substitute, abbreviate, rephrase, state in your own words.
- INTERPRETATION — extend, rearrange, differentiate, compare, determine, relate.
- APPLICATION — report, simulate, interview, sketch, paint, experiment, construct, try.
- ANALYSIS — deduce, group, classify, categorize, separate, compare, contrast, dissect.
- SYNTHESIS — devise, formulate, infer, write, create, compose, dramatize, illustrate, imagine, hypothesize, design.
- EVALUATION — appraise, assess, recommend, justify, evaluate, prove, decide, judge.

If initial learning focuses on the first two levels of thinking skills, then repetition can be designed to move to higher levels. This list is by no means exhaustive and the words at each level are simply meant to offer some possible ways of tapping into that particular skill.

There are countless other ways to structure a repetition so that it accomplishes the purpose that Ignatius and the *Ratio Studiorum* believed it should — a new savoring of what has already been learned from a new



or different perspective to help the material become an integral part of the learner.

CONCLUSION

Since this paper has been about the hallmarks of Jesuit pedagogy, it seems fitting to conclude it with a brief repetition in the Ignatian sense of that word. Take a few moments to reflect on each of the points in the chart²⁸ (that follows) keeping these two questions in mind:

- Is there anything new I learned, a deeper understanding I reached, something I found exciting or renewed my interest? Pause for a few moments and allow what you have learned to become a deeper part of you in a way that will help you savor what you have learned (you might want to try some right hemisphere learning techniques on the chart).

- Are there words that provoke no reaction in you or negative reactions? Pause a few moments and simply ask yourself what might have caused these reactions? Is there anything stopping you from dealing with a particular area?

You might spend a few moments simply recording for yourself anything that you found to be particularly fruitful for you as a result of reading of this paper.

FOUR HALLMARKS OF JESUIT PEDAGOGY AND LEARNING HOW TO LEARN

Through careful prelection, active learning in a reflective way and imaginative repetitions, the teacher begins to instill in the student the tools for learning how to learn, which is an overall goal of Jesuit Pedagogy, As *Go Forth and Teach* states:

Since education is a life-long process, Jesuit education tries to instill a *joy in learning* and a *desire to learn* that will remain beyond the days in school. “Perhaps even more important than the formation we give them is the capacity and concern to continue their own formation; this is what we must instill in them. It is important to learn; but it is much more important to learn how to learn, to desire to go on learning all through life.” (GFT 46)

**REVIEW SHEET FOR
THE FOUR HALLMARKS OF JESUIT PEDAGOGY²⁸**

Topics covered:	New Learning, Deeper Understanding, Surprises, Exciting Things	No reactions, negative reaction, no understanding, is there anything that stops me from learning these points?
PRELECTION		
1. Definition and purpose		
2. Promoting Interest in Homework and Study/Thinking Skills		
3. Relationship with Current Educational Theory A. Advance Organizer B. Anticipating Set C. Whole Brain Learning		
4. Relationship with Current Educational Techniques A. SQ3R B. Structural Overview		
REFLECTION and ACTIVE LEARNING		
1. Definition and purpose		
2. Relationship to St. Ignatius		
3. Effective Questioning Strategies and Active Learning		
4. Cooperative Learning and Active Learning		
5. Reflection A. Journaling B. Silence		
6. 4MAT and Active Learning and Reflection		
REPETITION		
1. Definition and purpose		
2. Relationship with Current Educational Techniques A. Whole Brain Learning 1. Visual Thingking 2. Mataphor 3. Fantasy B. Theories of Multiple Intelligence C. Higher Level Thinking Skills		



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Footnotes :

¹The *Ratio Studiorum* is the collection of basic educational principles and techniques developed from the time of Ignatius and his followers. The *Ratio* was finalized in 1599 and revised with the re-establishment of the Society of Jesus in 1832. For a brief but thorough history of the *Ratio*, see *The Manual for Jesuit High School Administrators*, 2nd ed. (New York: Jesuit Educational Association, 1957).

²Fr. Farrell's article is reprinted in Appendix A.

³See Linda Verlee Williams, *Teaching for the Two-Sided Mind* (New York: Touchstone Books, 1983) for further suggestions on using metaphor for introducing material in the classroom.

⁴Appendices B and C contain some sample prelections developed by Fr. Farrell for various subjects.

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⁵See Ralph E Metts, S.J., *Learning or Not* (New York: JSEA-CORD, 1987) for a more detailed discussion of learning style.

⁶Donald P. Kauchak and Paul D. Eggen, *Learning and Teaching: Research Based Methods* (New York: Allyn and Bacon, 1989).

⁷See also Eric P. Jensen, *Superteaching: Master Strategies for Building Student Success* (Del Mar, CA: Turning Point for Teachers, 1988) Chapter 8, "How to Open Your Class," for additional ideas about how to begin a class.

⁸David Ausubel, *Educational Psychology: A Cognitive View* (New York: Holt, Rinehart & Winston, 1968).

⁹Bruce Joyce and Marsha Weil, *Models of Teaching* (Englewood Cliffs, NJ: Prentice-Hall, 1986). Chapter 5 contains a thorough discussion of Ausubel's Advance Organizer.

¹⁰Madeline Hunter, *Master Teaching* (El Segundo, CA: TIP Publications, 1988).

¹¹The SQ3R technique was originally developed by F.P. Robinson in *Effective Studying* (New York: Harper & Row, 1946).

¹²Robert J. Tierney, John E. Readence and Ernest K. Disher, *Reading Strategies and Practices: Guide for Improving Instructions* (New York: Allyn and Bacon, 1980), p. 73.

¹³A table format has been used because it is an easy way to organize the material on a word processor. This material could just as easily be presented in schematic form without any of the boxes of the table.

¹⁴William Glasser, *Control Theory in the Classroom* (New York: Harper & Row, 1986).

¹⁵M.B. Rowe, "Wait Time and Rewards as Instructional Variables," *Journal of Research in Science Teaching*, 11, 1974, 81-94.

¹⁶See D. Johnson and R. Johnson, "Instructional Goal Structure: Cooperative, Competitive or Individualistic," *Review of Educational Research* 44 (1974), pp. 13-240. D. Johnson and R. Johnson, *Reaching Out: Interpersonal, Effectiveness and Self Actualization*, 2nd ed. (Englewood Cliffs, NJ: Prentice-Hall, 1986). Robert Slavin, *Cooperative*

Learning (New York: Longman, 1983).

¹⁷Jesuit High School in Portland, Oregon, has cooperative learning programs in place in many of their departments and can be contacted for additional information about how this learning technique works within the context of a Jesuit high school.

¹⁸*Education Leadership* is published by the Association for Supervision and Curriculum Development (ASCD), 1250 N. Pitt Street, Alexandria, VA 22314-1403.

¹⁹Parker Palmer, *To Know as We Are Known: A Spirituality of Education* (New York: Harper & Row, 1983).

²⁰Bernice McCarthy, *the 4Mat System: Teaching to Learning Styles with Right/Left Mode Techniques* (Barrington, IL: Excel, 1987).

²¹*Teaching for the Two-Sided Mind* contains many excellent techniques readily useable in the high school classroom.

²²See Michael Grinder, *Righting the Educational Conveyor Belt* (Portland, OR: Metamorphous Press, 1989), Chapters 5 and 6.

²³Tony Buzan, *Use Both Sides of Your Brain* (New York: EP. Dutton, 1983).

²⁴See Chapter 2 of *Learning or Not* for more information about NLP and eye movement patterns.

²⁵See *Learning or Not* for more discussion about this strategy.

²⁶Howard Gardner, *Frames of Minds: Theory of Multiple Intelligences* (New York: Basic Books, 1983).

²⁷An excellent resource for helping students explore and expand their seven intelligences is David Lazaer's *Seven Ways of Knowing: Teaching for Multiple Intelligences* (Palatine, IL: Skylight Publishing, 1991).

²⁸The chart is presented as a model study guide for repetition. There are many other ways to present this same material. You might wish to refer back to the mind map set forth earlier in this paper and do your repetition using the mind map as a guide.



APPENDIX A

NOTES ON JESUIT TEACHING PROCEDURES

Allan P. Farrell, S.J.

Jesuit Educational Quarterly for March 1943

I. THE PRELECTION

(It is planned to present in successive issues of the QUARTERLY, under the above general title, a series of notes on the chief Jesuit teaching procedures. The *Ratio Studiorum* did not expressly formulate principles of pedagogy, but rather took them for granted. Hence, the notes in this series will be based on the clearly implied principles of the *Ratio* as well as on its formal prescriptions. Following the general statement of principles, in regard to a particular procedure in teaching, application of these principles will be made to specific subject matter; especially on the high school level, e.g., the application of the prelection to the teaching of the *De Senectute*, to a class in geometry, algebra, history, chemistry, physics.)

PREAMBLE

The teacher has always had a dominant role in Jesuit education. Basil L. Gildersleeve once spoke of the need of great teachers — “teachers thoroughly possessed of their subject, fervid in their love of the vocation, affluent in illustration, watchful, inventive.”¹ The Jesuits who planned the *Ratio Studiorum* would have added the phrase “practiced in the arts and styles of teaching.”

It is, of course, true that methodology alone will not make an efficient and effective teacher; and no doubt, rare geniuses can to a great extent dispense with it. But for most teachers it is both helpful and necessary. For as Henry Simon well says: “It is not enough to quote Buffon’s ‘The style is the man himself, and assume that if you are an interesting person, you will make an interesting teacher, if not you won’t.’ Like most aphorisms, Buffon’s is only a half-truth when taken out of its original context. You cannot be a successful playwright or actor by simply having the foresight to be an interesting person. You must master these arts and their styles, and so it is with teaching.”² Besides, experimental psychology has amply shown that effective transfer of training is chiefly dependent on two things: the intelligence of the pupil and the

method of the teacher (i.e., the procedures by which the teacher utilizes the laws of learning in order to produce the desired results.).³

The teaching procedures of the *Ratio Studiorum*, though not in themselves original, were nevertheless not borrowed at haphazard, but because they seemed to be the best instruments for realizing three clearly conceived and logically connected pedagogical objectives of Jesuit education: *self-activity* on the part of the student, leading to *mastery* of progressively more difficult matter, and both *self-activity* and *mastery* leading to the *formation of intellectual and moral habits*.

The chief Jesuit procedures are: (1) the *prelection*, (2) *repetition* (one of the principal forms of which we now term the *class recitation*), (3) *emulation* in its various forms (“concertationes,” etc.), (4) *memory work*, (5) *examination procedures*, (6) system of *promotion of students*.

THE PRELECTION

A. Definition.

The prelection is the preview, conducted by the teacher with the active cooperation of the class, of every class assignment. It is *not a lecture*, but a prelude to and a preparation for private study and mastery of an assignment. The nearest equivalent of the prelection in modern pedagogical procedures is the technique of the lesson assignment. Henry C. Morrison’s *pre-test*⁴ has as its aim *one* of the purposes of the prelection, the aim of arousing curiosity, of motivating.

B. Basis in the Jesuit System.

The prelection is a natural way, as a means to an end, of realizing the principle of self-activity on the part of the student, which is considered a necessary condition both for mastery and for the formation of habits. Thus, the teacher is a coach; his chief task is to “create the mental situation and to stimulate the immanent activity of the student.”

C. Aims of the Prelection.

1. To awaken the interest of the students in the subject matter of the assignment; to motivate;
2. To set precise and attainable objectives for the assignment: what is to be aimed at — learning of

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vocabulary or facts, translation of an author or imitation, giving a summary of a chapter of history or solving a problem, mastery of a technical process or a metaphysical demonstration, etc.;

3. To point out more important or complicated phases of a subject, and to offer a solution of matters beyond the grasp of students at a particular grade level;
4. To indicate cognate subject matter when it is available and useful;
5. To suggest problems to be studied for review or discussion or judgment.

D. Values of the Prelection.

1. It gives the student a start on private study, and, thus, almost automatically provides motivation for at least some effort and interest in study;
2. It prepares the student to obtain from every subject and every assignment not only intellectual content but also an intellectual method (the basis of habit formation) — the best way to grapple with an assignment, how to explore its reaches as well as master its significant details, so that gradually the habit of orderly procedure and of mastery can result;
3. It makes it possible for the teacher to demand more thorough private study and consequently a better class recitation, discussion, etc.;
4. It is adaptable to any subject matter (languages, history, science, mathematics, philosophy), and it can be used effectively with slow or fast-moving classes;
5. With it the teacher can go into a few aspects of an assignment thoroughly (the *lectio stataria*) or into many aspects by way of introduction to a new subject or of preparing for a review or wide and rapid reading of subject matter (the *lectio cursiva*);
6. In the hands of a practiced teacher, it is a constant and fruitful object-lesson to the pupil in the art of studying, since he will have daily

contact with a mature and trained mind communicating its own planned method of mastering varied subject matter.

E. Principles for the use of the Prelection.

1. The prelection demands careful preparation of the teacher. It will be practically useless if given *impromptu*. The teacher should have an aim and a standard for each prelection: what he wishes to preview, to what end, in what manner; otherwise he will make random remarks, wise and unwise and, he will have a tendency to lecture, with the result that he will provide no genuine stimulus to mental activity on the part of the student.
2. The prelection must be selective: its norm must be not *multa*, but *multum*; not to cover everything in an assignment hurriedly;⁶ not to comment on exceptional usages or finer shades of meaning in beginning language study, nor on more complex points in any study. The principle of *divide et impera* has a very real application to the use of the prelection.
3. Adapt the prelection to the grade of the class and to the particular needs of a class from day to day and from week to week. This will prevent the teacher from laboring the obvious, e.g., drilling on grammatical forms when it is time to train for appreciation, reading off paragraph headings from a book, translating language lessons for pupils as a daily routine.⁷
4. The prelection needs, too, to be adapted to varied subject matter. The method will not be the same for history and language, for science and literature, etc. Establish the aim of the prelection, and then adapt procedures to attain this aim.
5. The rule of the *Ratio* regarding the restricted use of *erudition* in language prelections,⁸ applies to any subject taught in high school or junior college. Erudition is to be used moderately, sometimes as a stimulus to interest, but always with the view of making a precise point clearer. It should also be adapted to the grade and maturity of the class.
6. If the prelection is to be fully effective for the students, they should be urged to give close attention and not to attempt to take down what



the teacher is saying. This applies especially to high school classes.⁹

7. The tendency to view the time spent in giving the prelection as wasted or as wrested from other more important classroom duties (and pedagogical predilections of the teacher!) mistakes the fundamental purposes of education. Students themselves almost unanimously condemn the pure lecture system, especially on the high-school and junior college level. The time of the prelection is the teacher's opportunity for forming the studious habits of his pupils, for teaching intellectual method, for giving intellectual guidance, for coaching, for motivating, for setting the human capacities into action. (Note that there will be time for a proper sort of lecture during the period of the class recitation, q.v.).
8. Since the teacher gives considerable help to the students by his prelection, he should (a) be careful to assign a substantial *amount* of work for home-study, and (b) set his standard of demand in class recitation high, i.e., a specimen of *mastery* of the assignment.
9. The teacher's infallible yardstick in projecting the prelection is: what, in view of my own knowledge and appreciation of this particular subject matter, and consequently in view of my own enthusiasm for it, must I do first, to arouse the students' interest in it, secondly, to insure use by the students of an intellectual method (the right way of coming to grips with a subject) in studying it, and thirdly, to prepare the students for giving public proof of mastery of the assignment in the recitation period that follows.
10. The teacher's yardstick in the proximate preparation of each prelection is:
 - a. What particular result does he wish from the assignment — memory, understanding, organization of ideas, facility with forms, mechanics or artistry of expression, analysis or appreciation of reading, or a combination of two or more of these?
 - b. What connection with previous subject matter should be established?

- c. What words, terms, names, forms, constructions in the assignment are likely to need explanation, definition, illustration?
- d. What major ideas (content) need to be underscored, e.g., an author's principal argument, the theme of a poem, leading ideas of a chapter, a connection of cause and effect, an instance of weak reasoning or sophistry, etc.?
- e. What defect of previous study along similar lines needs to be indicated and corrected?

OBJECTIONS TO THE PRELECTION

1. "It takes too much of the class time and infringes on the recitation period." *Answer:* The aim of a practiced teacher is not chiefly to cover matter, but rather to form intellectual and moral habits. The teacher must, of course, cover matter, deal with ideas. But note that, though the prelection *seems* to consume valuable time, experience has taught that when the prelection is used faithfully and expertly, the recitation not only takes less time but is much more effective.
2. "The prefect of studies and the Province Syllabus demand that a large amount of matter be covered in a given period of time." *Answer:* The use of the prelection is no hindrance to covering subject matter at a reasonable rate even in the beginning of the year, and it will certainly make for greater speed as the year advances. The problem is readily solved if the teacher will employ the double system of intensive-extensive treatment of subject matter — *lectio stataria* and *lectio cursiva*. Some works or parts of an author, some periods of history, some phases of any subject demand and warrant careful and detailed study, while other works or parts of an author, other historical periods, other phases of any subject can be covered more rapidly and more cursorily.
3. "Modern textbooks, with their copious notes, make the prelection unnecessary." *Answer:* First, the objection refers only to textbooks for the ancient and modern languages. Secondly, in regard to these the objection is not valid because such notes do not fulfill the aims of the prelection. At best, they give some useful erudition (historical references, background, etc.) and occasionally

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clarify a word or a phrase or construction. For the most part, as any experienced teacher knows, they labor the obvious, fail to solve real difficulties, and spoon-feed the pupils by translating any passage that might challenge their ingenuity. The objection also misses the whole point of the prelection and the function of the teacher. The prelection is the teacher's formative period, the priming pump, the "booster,"

- a. for setting the boys' powers or faculties into motion on a particular subject matter;
 - b. for motivating, interesting them in that subject matter: *Voluntas movet omnes alias potentias; ubi amatur non laboratur, aut si laboratur, labor ipse amatur;*
 - c. for coaching and directing the student to get the maximum from his own personal study and self-activity.²
4. "The prelection pampers the students and destroys their initiative." *Answer:* Not if the teacher uses it correctly and sets his standard for mastery and proof of mastery at its proper level. As a matter of fact, the prelection should make for higher standards and challenge student initiative. Because of the help and stimulus he has given, the teacher has the basis for expecting and obtaining a better recitation, discussion, review; and he can conscientiously suggest or assign collateral reading, reasonable research projects and the like. The solution of this difficulty rests with the teacher.
5. "The prelection demands too much of the teacher." *Answer:* Ho-hum! *Hinc lacrimae!* The prelection is the keystone of the Jesuit system. Everything leads up to the prelection, and from it everything flows. Without it, Jesuit objectives are impossible or very difficult of realization.

NOTE: References in the *Ratio* of 1599 to the prelection:

1. The first and most general direction is contained in Rule 27 of the Rules Common to the Teachers of the Lower Classes.

2. There are particular directions in the rules for the teachers of the several classes: of rhetoric, of humanities, of the upper, middle and lower grammar classes.
3. The prelection is to be used when assigning composition work, as is explained in Rule 30 of the Rules Common to the Teachers of the Lower Classes.
4. The students are to give prelections on occasions in the classroom and in the exercises of the Academies. (Rule 33 of the Rules Common to the Teachers of the Lower Classes; Rule 3 of the Rules of the Academy for Students of Rhetoric and Humanities.)
5. The *Ratio* of 1832 makes it plain that the prelection is to be used for the teaching of the vernacular, and that the method to be employed is essentially the same as that prescribed for the ancient classics. Cf., e.g., *Ratio* of 1832, Rule 28, 2 of the Rules Common to the Teachers of the Lower Classes: "*Eodem fere modo praelegantur auctores classici in lingua vernacula.*"

Footnotes:

¹"Limits of Culture," in *Essays and Studies*, p. 6.

²*A Preface to Teaching* (Oxford University Press, 1938), p. 78.

³Cf. "The Psychology of Intellectual and Moral Habits," by Jaime Castiello, S.J., in the *JESUIT EDUCATIONAL QUARTERLY*, 4:62, September 1941.

⁴Cf. *The Practice of Teaching in Secondary Schools* (University of Chicago Press, 1936).

⁵Castiello, *A Humane Psychology of Education* (Sheed and Ward, 1936), p. 44.

⁶The *Ratio Studiorum* (1599) warns the teacher: *Multum autem proderit, si Magister non tumultuario ac subito dicat, sed quae domi cogitate scripserit, totumque librum vel orationem, quam prae manibus habet, ante perlegerit*" (Reg. comm. proff. class. infer., 27).

⁷Cf. in this regard the *Ratio* of 1591, Appendix ad regulas Professoris Humanitatis: "*Atque haec aliaque sunt,*



quae latine explicanda videntur etiam in prima classe [suprema grammatica], cuius singulae praelectiones duabus egent explicationibus: una quidem Latina. ...altera patrio sermone, et quidem semel tantum; modo id neque fiat tam particulatim, ac minutim, quam in inferioribus scholis, neque tam obiter, ac ieiune, ut verborum locutionumque germana vis nequeat enucleari. Denique posterior haec explicatio eo pressior ac brevior sit oportet, quo pueri aut magis in dies proficientes, aut Ion gius iam progressi vertente anno minus etiam hoc subsidio videbuntur indigere” (Bold added).

⁸CF. *Ratio*, 1599, Reg. comm. proff. class, infer., 27; Reg. Prof. Human., 1, 5; Reg. prof. sup. class, gram., 5. Erudition (embracing necessary historical or literary references or comparisons, in a word, essential scholarship) is not forbidden by the *Ratio*; it is in fact prescribed. It is simply not to be used for its own sake or beyond the capacity of the students to grasp its bearing upon the matter in hand.

⁹*Ratio* of 1599, Reg. comm. proff. class, infer., 27: “*Quas vero [observationes] excipiendas censuerit, quae multae esse non deberent, vel interrupte inter explicandum, vel seorsim, praelectione iam habita, dictet. Utile autem solet esse, ut grammatici nihil scribant nisi iussi.*”

¹⁰Inspiration is the highest qualification of any teacher. Inspiration is the most active of all stimulants: (Castiello, *A Humane Psychology of Education*, 44). Notes in a textbook do not inspire or quicken student interest.

APPENDIX B

NOTES ON JESUIT TEACHING PROCEDURES

Allan P. Farrell, S.J.

Jesuit Educational Quarterly for June 1943

II. THE PRELECTION APPLIED TO HISTORY

A. History in the *Ratio Studiorum*.

1. History was not given the status of a separate subject in the curriculum of the *Ratio* prior to the edition of 1832. However, historical background, especially from ancient history, was imparted through the study of the ancient classics and as a supplement to this study.¹
2. In the *Ratio* of 1832 there are two principal references to history as a separate subject. The first is contained in the eighth rule of the prefect of lower studies, paragraph eleven: "*Historiam, geographiam, matheseos elementa, et si qua alia in his scholis tradi solent, consulto Provinciali ita distribuatur [Praefectus] ut unusquisque Magister materiam sibi assignatam rite et commode possit absolvere.*" The second reference, in the first rule for the distribution of prizes, indicates that a prize was to be offered for proficiency in historical knowledge.²

B. Prolegomena on History Suggested by Expert Teachers.

1. Since history is supposed to be "the study of humankind in society from his beginnings to the present day," the teacher should bear in mind that one's life in society embraces not only political and economic areas, but cultural, social, and religious as well.
2. Begin the teaching of any course in history with a comprehensive historical outline, in order to give breadth to its study and a "frame of reference" for the particular epoch or field of history under consideration.
3. Insist throughout that the student build a strong framework of essential *dates*, important *names* ("History is the essence of innumerable biographies" — Thomas Carlyle), and major *events*. There should be no overemphasis on these items. Lord Acton rightly believed that "history should

not be a burden on the memory, but an illumination of the soul." Nevertheless, dates, names, and events are the framework needed for understanding, interpreting, and drawing conclusions.

4. Use visual helps — pictures, maps, etc. A proper use of geography and physiography is an aid to interest as well as necessary for an adequate understanding of history.
5. Orient the teaching of history from the revolutionary *Anno Domini*. All history teachers who must use a non-Catholic textbook should have at hand for consultation a Catholic text or Catholic sources. This will prevent ever assuming that the Church ceased to be a force after 1517.
6. Keep as an eternal objective the investigation of *why* as well as *how* historical events happened.

C. A First Day's Prelection in History.

1. Set the objectives of the course. Make them so understandable that any person of ordinary intelligence should be able to grasp them.³ Dictate these objectives to the class.
2. Summarize in about a dozen sentences the content of the textbook or course.⁴ And dictate this to the class also. For instance, American history course:
 - (1) English colonists (Protestant for the most part) settled along the Atlantic coast, 1607, while the French (Catholics) occupied Canada and the Mississippi Valley, 1608.
 - (2) A long series of wars between these two countries (1689-1763) ended in English victory. France lost its territory in America.
 - (3) Pick out the few really important divisions of the study at hand, and give the class a brief but connected view of them. In American history, for example, the main lines are:
 - (a) Colonies — roots of American history, Indians, Spain, France, England;
 - (b) American independence — Revolutionary War, Constitution, War of 1812;
 - (c) The Civil War; Modern America.



European history, 1500-1832, has five big topics: the so-called Renaissance, the Protestant Revolt, the so-called Enlightenment, the French Revolution, its immediate aftermath.

History, page 357, which dramatizes Lincoln's return to the White House, after his inauguration on March 4, 1861, to face alone one of the gravest crises in our history.

3. Such a thumbnail outline of main headings will be filled in gradually as the course advances. Subheads will complete the outline. Hence, students will have a summary of the whole subject matter in a dozen sentences and in a graphic outline. If these main ideas are made to stand out in the course, and are reviewed and interrelated, the teacher will find that students (even after the lapse of months!) can recall and discuss them.
 4. If time remains after completing the three steps described above, it will be profitable for the teacher to give the class a specimen of his mastery of and enthusiasm for the subject matter of the course, by summarizing highlights, indicating problems worth the students' attention, and making connections with contemporary thought, life, events, issues.
 5. The approach to a new course or period in history may be varied by giving the students a pretest to find out what knowledge, interest, opinions they have of the subject matter they are about to study. This pretest may be mimeographed or conducted orally. Careful preparation of questions is needed in order to prevent vague and confused answers. The test should also be brief and as challenging as possible. It will then arouse curiosity and sharpen interest in the course.
2. Showing students how to get to the *core* of a chapter or period of history. For this they must be taught to differentiate *big ideas* from supporting facts or merely incidental material. It is idle to have students put down in schematic form the topic sentences of a chapter; they can readily copy this from published outlines. The art is to resolve the chapter into its more significant ideas.
 3. Commenting on unusual words and on words and phrases that have a technical or emotional connotation, in order to make sure that students have clear concepts of important terms and consecrated phrases. Instances in point are such words as Renaissance, humanism, capitalism, mercantilism, fascism as applied to different countries, communism; such terms as the separation of Church and State, the difference in the Civil War period between nullification and secession.
 4. Teaching the art of tracing cause and effect; *why* and *how* something happened. A simple illustration is found in American history. In the Mexican War, northerners and southerners fought side by side; in 1861 they were divided, ready to shed one another's blood. What happened between 1848 and 1861 to bring about this change?

D. *The Daily History Prelection*

It may be used for:

1. Motivating interest, by
 - (a) setting sharply defined objectives for each study assignment;
 - (b) dramatizing the main situation in the assigned lesson;
 - (c) indicating problems to be answered through the assignment;
 - (d) connecting a new phase with antecedent phases;
 - (e) reading from the text an especially dramatic or challenging passage, such, for example, as that in Father S.K. Wilson's *American*
5. Teaching also the art of unifying and integrating the study of related periods of history. A plain example is the connection between the so-called Renaissance and the Protestant Revolt. Often the latter is introduced by a complicated series of "causes," among which the influences of the Renaissance are barely mentioned. A more natural and effective introduction would be to interrelate the two periods or movements. More mature students should be brought to shoulder weightier tasks; for instance, to differentiate the direct from the indirect effects of the industrial revolution on art, literature, religion; to unify the fourteen chapters of Hayes' *Political and Cultural History of Modern Europe*, Volume I, around the five leading ideas of the period, namely, the Renaissance, the

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Protestant Revolt, the Enlightenment, the French Revolution, and the immediate aftermath of the Revolution.

6. Identifying and clothing with flesh the chief actors or characters of a period. Names as well as dates and events must be given a substantial form. Students can be taught, for example, how to draw up a graphic *dramatis personae*, ordered according to importance and characterized according to personal qualities and actions.⁵
7. Locating on a map key places, states, etc., that are essential to an understanding of the text. This is of particular value when less known areas are being discussed — for example, the Balkan States; or when geographical divisions are in question, such as the Partition of Poland.
8. Assigning and connecting with the text illuminating collateral reading: for instance, Washington's inaugural and farewell address, the Webster-Hayne debate, the Lincoln-Douglas debate, the U.S. Constitution, *Uncle Tom's Cabin* in relation to the Civil War, Burke's speeches, Gilbert and Sullivan's opera *Patience*, which brilliantly satirizes the shallow aestheticism of Mallarmé, Wilde, and their followers. This type of collateral reading, together with such biographies as those by Belloc of the leading figures of the Protestant Revolt and French Revolution, will have for high school and undergraduate college students far more appeal and effect than any amount of thumbing through the works of authoritative secondary sources.
9. Assigning along the way problems to be answered, issues to be decided, relationships with the present to be established, historical principles to be set against an author's conclusions. These things may be too difficult for expert handling by the students, but they offer a challenge to mental effort and frequently quicken interest.

NOTE: The reader will, of course, be aware that not all of these various uses of prelection can be carried into effect in any one class. Nor can even one of them be thoroughly explored in the prelection period alone. What is set in motion by the prelection must be kept in motion and

speeded up during the class recitation that follows. However, such basic functions of the prelection as motivating interest, defining terms, and distinguishing principal from subordinate ideas, need to be exercised, at least with a new class, almost daily.

III. THE PRELECTION IN MATHEMATICS⁶

A. Mathematics in the *Ratio Studiorum*.

1. The *Ratio* of 1586 enumerated and exalted the multiple advantages of mathematical studies, outlined a full program of mathematics, and made provision for advanced study by those who showed special talent and interest.⁷ The 1599 *Ratio*, taking the benefits of mathematics for granted, prescribed a full year's course for all students in the second year of the Arts curriculum. Classes were to be held daily. The especially talented were to be given an opportunity for specialization.⁸ In the 1832 edition, even more emphasis was put on mathematics. The subject matter to be covered was more clearly defined; repetitions were to be conducted at least every second week; and several times in the year a public academy in mathematics was to be held.⁹
2. Nevertheless the *Ratio* did not give a place to mathematics in the curriculum of the lower (high-school) studies.¹⁰ The reason is plainly stated by the Fathers of 1586. In their view, the mathematical disciplines were to be associated with the *sciences* — *illarum praesidio caetarum quoque scientiae indigent ad modum* — and the sciences belonged in the Arts course. It is to be remembered that in the time of the old *Ratio* the average pupil in a Jesuit school began the humanistic course at about ten or eleven years of age, and completed it at fifteen or sixteen. During this time he concentrated on the classical languages and their auxiliary subjects. Then at about the age of fifteen or sixteen he passed to the Arts course to give his undivided attention to mathematics, philosophy, and science. Thus, there was no belittling of mathematics or science; but they had their own appointed place in the academic organization. In a different academic organization, such as we have today, mathematics and the sciences still go hand in hand.



B. *A First Day's Prelection in Geometry.*

1. *Statement of Objectives:* Primarily this course in geometry should assist in the mental training of the student by inculcating habits of strict logical reasoning, of orderly procedure, and of neatness. However, the course will also recognize the need the student has of facts which may be of practical value in pursuing other branches of learning and advanced courses in mathematics.
2. *Usefulness of Geometry:*
 - (a) for surveying, engineering, physics, chemistry, architecture, designing;
 - (b) for national defense;
 - (c) for a gentleman's knowledge of such things as angles, triangles, rectangles, circles;
 - (d) for order and accurateness;
 - (e) for cultivation of moral habits through the spirit of persevering hard work required in mathematical learning;
 - (f) for mind training; e.g., a mathematical problem, given in English, must be translated into geometric language, worked out in this medium, and the final results translated into English; a theorem in geometry may be compared to a thesis in philosophy.

It will depend on the ingenuity of the teacher to expand and illustrate these several objectives and advantages of the study of geometry.

3. An historical approach may be used with profit, particularly if the class has already studied some phases of high school mathematics. This will consist in tracing the historical evolution of the several branches of mathematics and especially the evolution of one branch from another.¹¹ For example:
 - (a) *Arithmetic*, i.e., computation with numbers, which started with counting, is limited to the simple operations of addition, subtraction, division, multiplication, fractions, and decimals. Something could be said of our number system (Arabic) as developed by Phoenician commerce, a great advance over

the cumbersome Roman notation. Arithmetic is quite restricted in scope. Certain types of problems cannot be solved except by algebraic methods. Necessity therefore gave birth to algebra.

- (b) *Algebra* introduced the use of the unknown "x," the equation, and the idea of transposition and exponents.
- (c) *Geometry* was advanced, chiefly in a practical way, by the Egyptians, who used it in surveying the valley of the Nile. The Greeks were theoretical and not experimental in their approach. Geometry too showed its limitations. So by combining algebra and geometry, thus introducing the function of angles, trigonometry was born.
- (d) *Trigonometry* is used in surveying, navigation, and astronomy, and it has many applications in the physical sciences. An interesting comment can be made on the origin of the "Ship's Log." Before books of logarithms were common, navigators computed the logarithms when plotting their position at sea in some sort of copy book. Gradually, too, they noted down certain events of the voyage in this book. Later, when books of logarithms were published, mariners continued to keep a record of their voyage, their daily position, and other interesting particulars. This record retains to this day the name of the "Ship's Log."
- (e) *Analytic geometry*. Descartes applied algebraic methods to the solution of geometric problems, and *vice versa*, expressing algebraic terms and expressions by geometric figures, e.g., straight lines and curves, on what we now call graphs. This branch of mathematics is the stepping stone to calculus and higher mathematics. It is to higher mathematics what logic is to philosophy.
- (f) *Calculus*, "the mathematician's most powerful tool," is a study of variable quantities, combining algebra, geometry, trigonometry, and analytics. A typical problem in calculus, however, is almost nine-tenths algebra.

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In tracing the historical development of mathematics, the teacher should bring out the fact that each successive stage or branch in mathematics is more efficient and concise in solving problems. He should also briefly illustrate each stage of development.

4. A practical introduction to the textbook may be substituted for, or supplement, the historical approach. If the teacher can give a clear and graphic conspectus of the several types of problems that will be dealt with in the course, this will suffice for a first day's prelection. Such a conspectus should begin with a short description of the bearing of arithmetic and algebra on geometry.
5. A jump in *medias res* is possibly the best prelection for a class in, say, fourth year of high school. The teacher might open the class thus: "Good morning, boys! I am glad to see you after the vacation. We have a great deal of work to do. So I will explain the first problem; you will work the next thirty."

C. A First Day's Prelection in Algebra.

After a few preliminaries of introduction, the teacher might conduct a review test in arithmetic. Its purpose would be threefold: to discover how much elementary mathematics the students know (a boy who cannot do simple arithmetic will find algebra very difficult); to help the students recall their grade school arithmetic; to present in a somewhat novel way information about the school. The following problems may be suggested. The student is to work the problem and state its type.

1. If there are 250 boys in the first year at St. Stanislaus, 171 in second year, 183 in third year, and a total of 841, how many are in the senior class?
2. If you wish to divide these 841 into classrooms of 35 each, how many classrooms will be required?
3. If it cost Thomas 25 cents a day for lunch, 14 cents for carfare, and 10 cents for incidentals, how much would he spend in twenty-one days?
4. If St. Stanislaus won twelve and lost three games last year, and if St. John's won sixteen and lost eight, how did the two schools compare? (Hint: ratio and proportion)

5. If the school property is 120 yards long and 69 feet wide, what is the area?
6. If 35 per cent of the student body attended Mass every day during Lent, what would be the actual number of students attending Mass?
7. How many students would the school have if its present numbers were doubled? Tripled? Squared? How many would there be if we only had the square root of our actual enrollment?
8. If 24 per cent of the students engage in debating activities, 42 per cent in sports, and 33 per cent in other forms of extracurricular activities, how many, in round numbers, take part in school functions?

D. The Daily Prelection in Algebra.

1. Granted that an *adequate* explanation of type problems is given by the teacher, the shorter this explanation is the better. For it is the teaching of experience that *desk* repetition of the prelection in high school mathematics is more fruitful than oral quiz or discussion. Hence, as soon as the teacher completes his explanation of type problems, the students should be put to work on some of the problems at their desks; the teacher meanwhile should walk about observing progress, giving individual help when needed, and calling general attention to common difficulties or mistakes he has noticed.
2. Ordinarily each new process in algebra builds upon what has gone before. Therefore, the teacher should, in his prelection, make the transition by summarizing the previous step and connecting the new with it. For instance, from the applications of Axiom I and Axiom II (on adding and subtracting equals to and from equals), he would make a transition to transposition, which is a short method of applying Axioms I and II to the solution of equations. Two or three types of equations would then be explained, and the students would be given a certain amount of time for working at the problems.
3. Shortly before the end of the period, problems for homework will be assigned. The assignment may depend on how many problems the students have been able to solve at their desks.



4. The emphasis laid on desk work need not prevent the teacher from conducting a brief oral repetition of the several steps in his explanation of type problems.

All competent teachers of mathematics stress the fact that there must be frequent written assignments. No other procedure pays in teaching mathematics. Boys will become interested through hard work in solving problems, provided that the teacher offers adequate *coaching* assistance by means of the prelection and by means of as much individual and group supervision in the classroom as may be possible.

Footnotes:

¹The *Constitutions*, Part IV, Chapter XII, A, define the humanities as embracing, besides grammar, what pertains to rhetoric, poetry, and history. An appendix to the *Ratio of 1591*, “*De Historiae Explanatione in Classe Rhetoricae*” (given in Corcoran, *Renatae Litterae*, pp. 279-280), clearly shows that ancient historians were to be studied not merely as writers but also as historians. On history in the *Ratio*, see Farrell, *The Jesuit Code of Liberal Education*, pp. 247-51.

²A debatable question might be the place of history in the Jesuit high school curriculum today. Should ancient, medieval, and American history be included? Are high school students mature enough to achieve worthwhile objectives in history? Does not so much history displace essential emphasis on language? Does it not tend to lessen interest in the college study of history where more profit can be derived? If so, much history is needed in high school because many students terminate education with high school, would not the argument apply also to philosophy, sociology, etc.? The debate is, of course, apart from the purpose of these notes on teaching.

³It would be an enlightening experiment to test with parents and students how much of the frequently high-sounding description of aims, methods, and standards in our school catalogues and syllabi they really understand.

⁴Should a teacher think that this procedure is a waste of time or just silly, let him probe his thinking by experiencing the difficulty of the task and its fruitfulness for both teacher and the class.

⁵A stimulating review of an historical epoch or movement can be centered on important names or dates or events. It can give the student that ‘new view’ of an old matter which is a prime factor in effective repetition.

⁶I am indebted to a number of experienced teachers of the California Province for their collaboration in preparing these notes.

⁷For the *Ratio* of 1586 see Pachtler, *Ratio Studiorum et Institutiones Scholasticae Societatis Iesu*, II, 141-43. The Fathers of 1586 conclude: “*Conandum igitur est, ut sicut facultates caeterae, ita et mathematicae in Nostris Gymnasiis floreat, ut hinc etiam Nostris fiant magis idonei ad variis Ecclesiae commodis inserviendum, cum praesertim non parum indecore careamus Professoribus, qui rerum Mathematicarum lectionem tam multis, tam praeclaris usibus exoptatam habere possint.*”

⁸*c.f.* *Ratio* of 1599, rule 20 of the Provincial and the Rules for the Professor of Mathematics (Pachtler, *op. cit.*, II, 256, 348).

⁹The prescriptions of 1832 are also in Pachtler, *op.cit.*, 348-49.

¹⁰There were exceptions, however. In Poland, for instance, the Jesuit colleges obtained permission to teach mathematics in the grammar classes. cf. article by Father Bednarski in *Archivum Historicum Soc. Iesu*, II, 205, July-December 1933.

¹¹Teachers may find *Mathematics for the Millions*, useful in supplying interesting and illustrative anecdotes, despite its unscholarliness, bigotry, and materialistic views.

APPENDIX C

NOTES ON JESUIT TEACHING PROCEDURES

Allan P. Farrell, S.J.

Jesuit Educational Quarterly for October 1943

IV. THE PRELECTION IN HIGH SCHOOL SCIENCE

A. *Science in the Ratio Studiorum.*

1. Following the prescription laid down in the *Constitutions*, Part IV, Chapter 12, C, “*Tractabitur Logica, Physica, Metaphysica, Moralis scientia et etiam Mathematicae*,” the *Ratios* of 1586 and 1599 placed the study of science, as then known, in the Arts course. It was part of the philosophical curriculum, and was limited to the study of physics as Aristotle presented it.² In the *Ratio* of 1832 a special section was captioned “*Pro Physica*,” under which were included, besides physics, the elements of astronomy and a short treatise on chemistry.³
2. It should not be thought, from these meager references that the Society was not interested in the sciences; the *Bibliothèque* of Sommervogel fully proves that it was. And as scientific studies widened, the Society’s scholars took rank among the leading savants everywhere. The teaching of science on the secondary level, however, is a modern development.

B. *A First Day’s Prelection in Physics.*

1. If the teacher is able to do it interestingly, the best prelection for the opening day of class is a statement and explanation of the *objectives* of the course. The following objectives should be included: Science in high school for the average student should strengthen and complement his humanistic training by introducing him to the facts and principles that operate in the physical world. Besides providing a foundation for engineering and allied professional fields, physics should contribute to the essential three-dimensional growth of the student (extent, breadth, and depth of knowledge) by laying for him the basis for a more complete understanding and appreciation of the world in which he lives as it affects and illumines the arts, literature, culture.

(E.g., two men’s impressions of a view of the Grand Canyon or of a sunset.)

2. The teacher should emphasize the fact that we study physics with the definite purpose of correlating and classifying our knowledge, thus making possible logical deductions and applications. He should then state and explain the following precise objectives:
 - (a) a fair working knowledge of the theory and application of physical principles;
 - (b) the understanding and working of ordinary problems in physics;
 - (c) a simple, efficient, and orderly laboratory technique.

These objectives will be better realized if they are oriented not only toward engineering and specialized scientific studies but also toward the fully cultural development of the student, toward the formation of intellectual and moral habits.

3. In concluding the first day’s prelection, the teacher could point out some of the topics that are studied in physics. The purpose would be to arouse the curiosity and interest of the class. Such topics, for instance, are: How the earth is weighed; how steel ships float and how submarines made of steel can be so controlled as to rise or sink at will, the flight of the airplane; the human voice; sound movies; the electric organ; the human eye and the perception of images, etc. If time permitted, the teacher could take one of these topics and briefly illustrate how physics contributes to its understanding and appreciation.

C. *A Procedure for the Daily Prelection in Physics.*

1. Briefly set forth the objective(s) of the individual day’s work. By telling the class that it is going to learn only one or two new principles at this time (especially in the beginning study of physics), those who doubt their scientific ability will not feel overwhelmed or discouraged and, hence, become inattentive.
2. Give a general introduction to a topic; e.g., magnetic effects of an electric current. Offer some



practical uses of these magnetic effects, such as door bells, electromagnets, relays, electrical meters (voltmeters, ammeters, etc.), telephone receivers, loud speakers, automatic circuit breakers, transformers. This will help the class to realize that it is worthwhile to learn the principles well and to give strict attention.

3. Explain the theory or/and experiment by which a principle was derived. Since physics often deals with experimental facts that are difficult to explain, use of analogies will aid the class and make the teacher's task easier. If deriving a formula, take either an example or an analogy to show the derivation.

(a) *An Example:* Force equals area times height of a column times density. Take a practical example of the force exerted by a certain amount of mercury or water.

(b) *An Analogy:* In explaining Ohm's law, an analogy frequently employed is that of using water pressure, rate of flow, and resistance to flow compared to voltage, current, and electrical resistance.

4. Ask a brief repetition of the main points of your prelection to check on the students' grasp of them. Let the class assist in working a type problem on the board.
5. Tell the class about the demonstration material you have on the table and what you are going to do with it. Expect the class to be able to suggest what will happen and why it will happen.
6. Perform the experiment and explain the results as they are taking place.
7. Explain in some detail some practical applications of the principle involved in the experiment.

D. Notanda for the Physics Prelection.

1. Sometimes an experiment or demonstration may be worked out in the beginning of a class, so as to require the students to write out an explanation of the result that took place; e.g., show the action of two iron rods suspended freely within a coil carrying an A.C. current. The rods violently repel

each other as soon as the current is turned on. Why?

2. In using the prelection, (a) teach the boys how to form the habit of making mental connections as an aid in memorizing formulas and rules; (b) convey ideas through the senses of sight and touch as well as through that of hearing (using pictures, diagrams, etc.; passing around two similar bottles, one of water, the other of mercury, to convey an idea of specific gravity, and to demonstrate that mercury is really more than thirteen times as heavy as water); (c) if a theory is to be rejected (e.g., corpuscular theory of light), let the class think out as many objections to the theory as it can.
3. Since it is supposed that a short repetition has been asked at the end of the prelection, the *recitation* period should open with a quiz to see whether or not the class has mastered the main lines of the matter, and can connect principle and problem, or refer problems to principles. The quiz should also attempt to find out if the class is able to think out further practical applications of principles.

E. A First Day in Chemistry.

1. The textbook looks formidable to the students. Chemistry will thus seem both difficult and distasteful. The teacher's first task, then, will be to offset so unfavorable an impression. What is fascinating about chemistry? Show *that* in the book; show what else the book will open up for the students and how it will open up these interesting and challenging phenomena.
2. Tell the class the purpose of the course; where the textbook fits into the course. A *syllabus* will give the aims of the course. Briefly explain these and illustrate. (If no formal syllabus has been prepared, the teacher's first prelection must, in essence, be the presentation of such a syllabus). Aims clearly understood and illumined aid motivation and deeply influence the learning process.
3. If time remains, or it seems feasible, give a brief but graphic view of the development of chemistry — from Aristotle, who thought that the world was made up of earth, air, fire, and water. This idea persisted in a degree till about the time of Robert Boyle, 1661. (The teacher could mention the

alchemists of the Middle Ages, who thought that everything was made of philosophical mercury, sulphur, salt and who had an influence on chemistry in making experiments to produce gold.) Beginning with Boyle, give a short sketch of modern chemistry.

F. *The Use of the Daily Prelection in Chemistry.*

Three types of prelection may be distinguished in regard to chemistry:

1. The *first type* will be used for introducing the class to a new topic or part in chemistry. This will be intensive, like the *lectio stataria* used for language teaching. The theory will be explained in detail, and problems will also be carefully worked out.
2. The *second type*, for more advanced students, may also be used, e.g., for treating of the various elements and compounds. It prepares for understanding rather than for memory. (No need to memorize the elements and compounds; they can be found in any book on chemistry at a moment's notice.)
3. The *third type* of prelection prepares the student to work experiments in the laboratory. It seeks to link theory and principles to experiment; but it also teaches accurate handling of chemicals, materials, etc. At the beginning, this sort of prelection must be given with care, if only to avoid serious accidents, which can take place in a chemical laboratory.

The prelection of this type is an example of the general rule that the purpose (in a most general sense) of the prelection is to introduce students to any and every assignment — whether it be study, writing, memory lesson, laboratory tasks, reading, working problems, etc.

Footnotes:

¹I wish to acknowledge a debt to a number of experienced science teachers of the California Province for help in preparing these notes.

²Cf. Pachtler, *Ratio Studiorum et Institutiones Scholasticae Societatis Iesu*, II, 135-39, 334-36.

³Pachtler, *op. cit.*, II, 346-48.