Thinking Skills Practices of Secondary School Teachers in Ilocos Sur

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Abstract

This study was conducted to determine the thinking skills practices of the secondary school teachers in Ilocos Sur, particularly along developing foundations of reasoning; sensing and defining a problem; collecting evidence on problems; organizing evidence on problems; interpreting evidence on problems; selecting and testing hypotheses; formulating conclusions, and evaluating students. The thinking skills most and least attended to by the teachers, and the relationship between the extent of thinking skills practices of the teacher-respondents were also looked into in this study.

The descriptive-correlational research design was used. The respondents comprised of 60 teachers and 600 students in IS high schools in the Division of 1locos Sur. The main data gathering instrument was adopted from Hernandez, et al. (1994). Data were analyzed through the use of the following statistical tools: frequency count and percentages; weighted mean; and the Simple Linear Correlation Analysis.

Findings revealed that most of the teacher-respondents are in their middle age, female, with master's units, and are experienced teachers.

The secondary school teachers in Ilocos Sur are average thinkers. Skills in formulating conclusions were the most often attended to while skills in interpreting evidence on problems were the least attended to by the teachers. They are not much proficient to teach these skills especially skill in interpreting evidence on problems the fact that they seldom practised this skill. They are not yet much capable in planning activities that would enhance the development of such thinking skills. They could no yet fully provide activities that would develop students' thinking skills.

Teachers extent of practice of thinking skills is not related to their personal/professional characteristics such as age. sex, educational attainment,

ant years of teaching experience. By skill, educational attainment is related to teachers' practice of selecting and testing hypothesis.

It was recommended in tne say that the secondary school teachers in Ilocos Sur should advance themselves professionally by finishing their graduate studies; should undergo training for teachers with focus on teaching strategies to help develop critically thinking students.

Introduction

Background of the Study

The main goal of education is to develop the learners to their fullest potential. They must be prepared to face the ever changing world. As Dewey (1968) stated "the aim of education is to teach the child to think, not what to think." The fast-paced discovery of new principles and theories, which are now released in months or days instead of years or decades, requires the need to extend the learning boundaries of the learners. Leaming can no longer be limited to whatever appears on the books. The students should be equipped with the necessary skills to overcome this situation. One of these skills is thinking skills. Of course, a well-trained teacher on the use of thinking skills is necessary for the students to acquire and develop such skills.

Marzano and Arredond (1986) stressed the need for teaching thinking. They stressed,

> "The world is changing rapidly. Some say as many as 80 percent of the jobs that will exist in the year 2000 have not been invented, yet the knowledge of the world increases 8 to 15 percent every year. Since thinking skills necessary for the success in the information age are not overtly taught (students pick them up from their environment), the education system is acting as a sorting system. As the job market becomes more and more polarized (e.g. high technology versus manual labor or service jobs), this might cause great social unrest in the future."

How knowledge and literacy are taught and used influenced the development of cognitive skills among the students. According to Glaser (1984), the development of this skill should not be neglected. The task is to produce a changed environment for learning - an environment in which there is a new relationship between students and their subject matter, in which knowledge and skill

becomes objects of interrogation, inquiry, and extrapolation. As individuals acquire knowledge. they also should be empowered to think and reason.

According to Presseisen (1988), one of the major thrusts of teaching thinking involves not only leaming cognitive skills, such as analysis. classification, and evaluation. but also becoming conscious of the strategies that are appropriate in the particular cognitive task. Metacognition which is the "ability to know what we know and what we do not know" or thinking about the way we think. is now viewed as central to the development of skillful thinkers (Costa, 1984). It is not adequate to master the core thinking skills and complex processes per se; the learning-to-learn strategics that enable students to plan, monitor and revise their own activity for more productive performance are also required for competence development and for the independence of the learner.

Given the complex world students today face, Chipman and Segal (1985) suggest that the flexibility and competencies embedded in the techniques of learning how to learn may have the most lasting influences on student achievement. Further, for them to achieve their own personal goals in life, it is important for them to be equipped with the needed thinking skills.

Widespread concern about students' poor thinking skills has been expressed recently by educators, journalists, and the public at large. The National Assessment of Educational Progress has reported that students show weaknesses in the logical processes required for clear communication. In a nation at risk. the National Commission on Excellence in Education noted that students have a poor command of such intellectual skills as drawing inferences and solving problems

The College Board's Project Equality booklet. academic preparatton for college, called for the teaching of reasoning as a basic academic competency, along with reading, writing, speaking, listening, and mathematics. Finally, employers frequently report that young people lack the ability to think through problems and offer alternative solutions (Eric Digest, 1984).

In spite of acknowledgement of the need to help students develop intellectual skills, little consensus exists about how thinking skills should be taught and who should teach them. Should thinking be taught as a separate skill, as part of each subject area, or as both? What thinking skills are they practicing and how often are they practicing these skills? Hence. the study.

Significance of the Study

With the impact of thinking skills on the achievement and personal goals of the students, a survey on the thinking skills practices of the secondary school teachers in Ilocos Sur is needed since the teachers are the trainors of the students in developing their thinking skills.

The data gathered could provide information on the most and least common thinking skills practices of the secondary school teachers. These findings can help school administrators in planning for teacher-training activities particularly in improving the critical thinking skills of teachers giving emphasis on developing higher-order thinking skills *(hots)* among the students which are much needed in the curriculum. Moreover, the findings can also help curriculum planners initiate changes in the curriculum that will include more classroom-ready teaching strategies that promote higher order-thinking skills among the students. Furthermore, results of the study could also help determine what thinking skills to focus on in pertinent teacher education courses and/or in classroom teaching.

Objectives

This study was conducted to determine the thinking skills practices of the secondary school teachers in Ilocos Sur.

Specifically it sought to:

I. Describe the teacher-respondents in terms of the following personal/professional factors: age, sex, educational attainment, and years of leaching experience;
2. Determine the extent of thinking skills practices of the teacher-respondents, particularly along the following skills:
   a. developing foundations of reasoning.
   b. sensing and defining a problem,
   c. collecting evidence on problems,
   d. organizing evidence on problems,
   e. interpreting evidence on problems,
   f. selecting and testing hypotheses,
   g. formulating conclusions. and
   h. evaluating students;
3. Determine the thinking skills most and least attended to by the teachers: and
4. Find out whether the extent of thinking skills practices of the teacher-respondents significantly related to their personal/professional characteristics.

Review of Literature

Gilhooly (1982) defines "thinking" as a set of processes whereby people assemble, use and revise internal symbolic models. These models may be intended to represent reality (as in science), or abstract with no particular interpretation intended (as in music or pure mathematics).

According to Bruner (1957), thinking directed toward problem solving may be regarded as exploring a symbolic model of the task to detennine a course of action that should be the best (or at least be satisfactory) A symbolic model often enables the thinker to go far beyond the perceptually available information, and to anticipate the outcomes of alternative actions without costly overt trial and error. Thinking skills has become a generic phrase used to encompass many processes involved in learning and problem solving (Blagg. et al., 1988).

Hc:rnandez, et al. (1993) conducted a study on the thinking skills practices of school teachers in Metro Manila. They found out that .the teachers most often provided experiences on observing, seeing differences. seeing similarities, classifying. discovering relationships, sensing problems involving personal. community, environmental problems, recognizing specific problems in personal. community, environment problems, stating problems definitely and concisely, developing skills in using references, developing skills in note taking, developing skills in using reading aids in books, using visual aids in securing evidence on a problem, selecting the important ideas related to the problem, inferring from facts and observation. formulating conclusions on the basis of tested evidence, and applying conclusions to new situations. It was also found out that the teachers least often provided experiences on making hierarchical classification, defining hierarchical classification, conducting personal interviews about problems, and developing skills in interviewing.

Marzano (1971) identified thinking skills that often occur in varied situations as follows: focusing which includes defining a problem and goal setting; information gathering by observing and questioning; remembering skills by encoding and recalling; organizing skills through copying, classifying, ordering and representing; analysing skills which includes identification of attributes, relationships and patterns, main ideas, and errors; generating skills through inquiry, predicting. and elaborating; integrating skills by summarizing and relationship: and evaluating skills by establishing criteria and verifying.

Methodology

Research Design. This study used the descriptive-correlational design. It described the teacher-respondents in terms of personal/professional factors: and the

extent of their thinking skills practices. The correlational method was utilized in looking into the relationship between the extent of practice and personal/professional characteristics of the respondents.

Scope of the Study. This study covered I5 high schools in the Division of Ilocos Sur which are within the national high way. Considering the big number of secondary school teachers in Ilocos Sur, I6 teachers from each school (four each among the Science, English, Mathematics and Makabayan teachers) were considered. Hence, ' 60 teachers from the I5 schools were taken as teacher-respondents. To validate the responses of the teachers, IO students of each teacher were also taken as respondents of the study. A. total of 600 students were involved in the study.

The data gathering instrument used in the study composed of two parts: Part I– a questionnaire made by the researchers was used to gather information regarding the personal/professional profile of the respondents. Part II - a questionnaire-checklist adopted from Hemandez. et al. (1994).

Data gathered in the study were analyzed through the use of the following statistical tools: frequency count and percentages; weighted mean; and the Simple Linear Correlation Analysis.

Results and Discussion

Profile of the Teacher-Respondents in Terms of Personal/Professional Factors

The respondents of the study are teachers in selected high schools in [locos Sur. The distribution of thc respondents in terns of age, gender, educational attainment. years of teaching experience, and subject taught is presented in Table 1. These characteristics arc believed to have direct and indirect bearings on the thinking skills practices of the respondents in the conduct of their classes.

Age. The table shows that most (26 or 43.34%) of the teacher-respondents are within the age range of 31-40 while the least (5 or 8.33%) belong to age range *50* and above. This suggests that the respondents are within the middle age group.

Gender. Thc majority (42 or 70.00%) of the respondents are females. Only little less than one-third (18 or 30.00%) of the respondents are males.

Table 1. Frequency distribution of the teacher-respondents in terms of personal/professional factors.

PERSONAL/PROFESSIONAL FACTORS	FREQUENCY N=60	PERCENTAGE (%)
Age		
Above 50	5	8.33
41-50	14	23.33
31-40	26	43.34
30 and below	15	25.00
Sex		
Male	18	30.00
Female	42	70.00
Educational Attainment		
With Doctoral Units	2	3.33
Master's Degree	7	11.67
With MA units	43	71.67
Baccalaureate	8	13.33
Years of Teaching Experience		
More than 20 years	II	18.33
16-20	8	13.33
11-15	6	10.00
6-10	26	43.33
Years ad below	9	15.00

Educational Attainment. The greatest percentages (71.67%) of the respondents have master's units. Only a few have finished **MA** degree (7 or 11.67%) and doctorate degree (2 or 3.33%). This is a manifestation that the teacher-respondents have the desire to grow professionally by taking-up graduate studies.

Years of Teaching Experience. It can be gleaned from the table that most of the teacher-respondents have 6-10 years of teaching experience while the least (6 or 10.00%) have been in the teaching profession for II-15 years. This finding indicates that the respondents are already considered experienced teachers.

Thinking Skills Practices of the Teacher-Respondents

The discussions in this section are focused on the thinking skills practices of secondary school teachers in Ilocos Sur as assessed by themselves and their students though the thinking Skills questionnaire,

The extent of practice for a particular skill, as reflected by the combined mean ratings of the two groups of respondents (teachers and students), indicate the teachers' proficiency in that skill. This assumption is anchored on what Beyer's (1988) asserted, "to be able to teach a skill, a teacher must be able to model or provide models for that skill to the students." In other words, modeling a skill means practicing that skill. and it is only when you are knowledgeable on such skill that you can do it with proficiency.

The tcaching practices of the teacher-respondents are discussed by particular thinking skill, and by the subject they are teaching. The specific sub-skills most and least practised by the teachers by subject area were also noted.

Teaching Practices Related to Skills in Developing Foundations of Reasoning. Table 2 presents the I6 sub-skills included under the skills of developing foundations of reasoning. Generally, the teacher-respondents "occasionally' provide class activities geared towards students' development of foundations for reasoning (K=2.94). When the teachers were grouped according to the subject they teach, the same findings were obtained. However, further scrutiny of the mean ratings shows that the English teachers obtained the highest (3.16) and the Makabayan teachers. the lowest (2.64).

The teacher-respondents "often" provide class activities to develop students' skills in observing and understanding language. However, they "seldom" exposed their students to activities that develop their skills in identifying orderable dimensions, making hierarchical classifications, and defining hierarchical classifications. The other sub-skills were "occasionally" practised by the teachers.

For the Science teachers. it was claimed by themselves and their students that they "often" provide their students with activities that develop their skills in observing, understanding language and reading for meaning. From among the sub-skills under the skills of developing foundations for reasoning. skill in observing was the most attended to.

Table 2. Mean ratings **showing the extent of thinking skills practices of** secondary school teachers **in Ilocos Sur along** developing of foundations of **reasoning.**

DEVELOPING FOUNDATIONS OF REASONING	SCIENCE TEACHERS		ENGLISH TEACHERS		MATH TEACHERS		MAKABAYAN TEACHERS		AS A WHOLE	
	X DR	RANK	X DR	RANK	X DR	RANK	X DR	RANK	X DR	RANK
1. Observing	3.65 Of		3.70 Of	3	3.27 Occ	3	3.32 Occ		3.49 Of	
2. Seeing differences	3.26 Oc	4	3.36 Occ	5	313 Occ	5	2.75 Occ	5	3.13 Occ	4
3 Seeing similarities	3.12 Occ	5	3.37 Occ	4	3.69 Of		2.40 Se	4	315 Occ	6
4. Grouping	2.99 Occ	7	3.34 Occ	6	2.85 Occ	9	2.71 Occ	6	2.97 Occ	7
5 Classifying	2.85 Occ	10	3.18 Occ	8	3.04 Occ	7	2.75 Occ	8	2.96 Occ	85
6. Formulatng hypotheses	2.71 Occ	12	3.08 Occ	10	2.64 Occ	14	249 Se	10	273 Occ	105
7. Testing hypotheses	2.76 Occ	11	2.87 Occ	12	2.71 Occ	11	2.28 Se	12	2.63 Oc	12
8. Ordering sequences	2.70 Occ	13	307 Occ	11	2.69 Occ	12	2.45 Se	11	2.73 Occ	10.5
9. Identifying orderable dimensions	2.67 Occ	15	2.74 Occ	14	2.75 Occ	10	224 Se	14	2.60 Se	14
10. Describing orderable dimensions	2.68 Occ	14	2.78 Occ	13	2.68 Occ	13	2.45 Se	13	2.64 Occ	13
11. Making hierarchical classifications	2.64 Occ	16	2.55 Se	16	2.48 Se	16	2.44 Se	16	2.53 Se	16
12. Oefining hierarchical classifications	2.87 Occ	9	2.60 Se	15	2.58 Se	15	2.27 Se	15	2.58 Se	15
13. Discovering relationships	2.94 Occ	8	3.11 Occ	9	2.97 Occ	8	2.80 Occ	9	2.96 Oc	86.5
14. Solving analogies	3.10 Occ	6	3.20 Occ	7	3.22 Occ	4	2.69 Occ	7	3.05 Occ	6
15. Understanding language	3.57 Ot	2	3.83 Of		3.41 Ol	2	3.01 Occ	2	3.46 ol	2
16. Reading for meanino	3.50 Of	3	3.72 Of	2	310 Occ	6	322 Occ	3	3.39 Occ	3
Overall	3.00 Occ		3.16 Occ		2.96 Occ		2.64 Occ		2.94 Occ	

The frequent provision of activities for the students 1o develop their observing skills is a good teaching practice of the science teachers. Observing is considered the groundwork for more complex operations such as classifying, hypothesizing or inferring as it is a focusing perception on some phenomena or

object. The teachers could have provided activities for students to observe accurately, allowed them to discuss and compare observations and could have provided opportunities for them to recognize pallems in a particular operation or procedure. However, the provision of activities to develop skills of classifying, hypothesizing and formulating hypotheses were only "occasionally" practised by the science teachers.

Table further shows that skills in making hierarchical classifications was the least attended to by the teachers. Provision of activities relative to this sub-skill was only "occasionally" practised. This is expected because this skill is a consequence of having fully developed the skill of classifying which the teachers are not proficient in.

For the English teacers, they and their students believed that these teachers "often" provide activities geared towards the development of understanding language, reading for meaning, and observing. Skill in understanding language was the most attended to by the English teachers. This is a good teaching practice by these teachers inasmuch as this skill, together with reading for meaning, is necessary to develop their comprehension ability which is one of the concerns of an English teacher.

Skills in seeing differences and similarities, and ordering sequences should also be the concerns of English teachers. However, provision of activities to develop these skills among the students was only "occasionally" practised by these teachers. From among the 16 sub-skills, making hierarchical classifications was the least attended to by the English teachers. This skill was "seldom" practised together with the skill of defining hierarchical classifications.

Further scrutiny of the table shows that the Mathematics teachers were perceived to have "often" provided opportunities for students to develop skills in seeing similarities, and understanding language. Sub-skills like classifying. ordering sequences. discovering relationships, and solving analysis, which are supposed to be developed in mathematics classes, were only "occasionally"" attended to by the teachers. With the nature of Mathematics, allowing students to fom as many groups or categories based on common features or attributes, letting students arrange entities from relatively simple to highly complicated, and encouraging students to justify the bases of their own categorization are supposedly used to a great extent.

It is noted from the table that developing skills in making hierarchical and defining hierarchical classification were only "seldom" practised by the teachers. These skills are expected to be developed by the students in Mathematics classes.

The skill in observing was also most attended to by the Makabayan teachers. However. provision of activities to develop this skill was "occasionally'

practised. There are seven sub-skills under the skill of developing foundation of reasoning that were "seldom" attended to by the teachers, namely: seeing similarities, formulating hypothesis, testing hypothesis, ordering sequences, identifying orderable dimensions, describing orderable dimensions, defining hierarchical and making hierarchical classifications. The last sub-skill was the least attended to.

Teaching Practices Related to Skills in Sensing and Defining a Problem. Sensing and defining a problem refers primarily to classifying situations that are puzzling in some way. It involves asking questions that help students define the boundaries of a problem. There are 9 sub-skills of sensing and defining a problem. These are reflected in Table 3.

Table 3. Mean ratings showing the extent of thinking skills practices of secondary school teachers in Ilocos Sur along sensing and defining problem.

SUB-SKILLS	SCIENCE TEACHERS		ENGLISH TEACHERS		MATH TEACHERS		MAKABAYAN TEACHERS		AS A WHOLE	
	X DR	Rank	X DR	Rank	X DR	Rank	X DR	Rank	X DR	Rank
Sensing situation Involving problem	3.45 Of		335 Occ	5.5	325 Occ	2	309 Occ	2	3.29 Occ	2
2. Recognizing specific problems in situations	3.29 Occ	3	3.38 Occ	4	305 Occ	7	2.84 Occ	5	3.14 Occ	
3. Isolating major idea of a problem	3.14 Occ	4.5	3.19 Occ	7	317 Occ	4	2.99 Occ	4	3.12 Oc	5
4. Stating problem definitely and concisely	3.12 Occ	6.5	3.07 Occ	8	3.00 Occ	8	255 Se	8	2.94 Occ	8
5. Picking out and defining key words	3.12 Occ	6.5	3.51 Of	1.5	3.09 Occ	6	273 Occ	7	3.11 Occ	6
6 Evaluating problems in terms of needs	2.96 Occ	8	335 Occ	5.5	3.16 Occ	5	2.84 Occ	6	3.08 Occ	7
7 Becoming aware of exact meanings of word groups	3.14 Occ	45	351 Of	t.5	3.20 Ooc	3	3.08 Occ	3	3.23 Occ	3
8. Discussing possible problems for study	3.31 Occ	2	3.50 Of	3	338 Occ		3.23 Occ		3.36 Occ	
9 Conducting personal interviews aboul roblems	272 Occ	9	2.91 Occ	9	2.82 Occ	9	237 Ooc	9	2.71 Occ	9
Overall	3.14 Ooc		3.31 Occ		3.12		2.85 Oc		3.11 Occ	

The tcacher-respondents, as a whole and by group of respondents, "occasionally" provide activities that help develop skills in sensing and defining a problem. This is based on the mean ratings which ranges from 2.60-3.40. As a whole. discussing possible problems for study was the most frequently practised

while conducting personal interviews was the least frequently practised. This was also the least frequently practised by the four groups of teacher-respondents.

For the Science teachers, the practice of giving activities such as sensing situation involving problem was rated the highest by the teachers themselves and their students. This implies that the teachers often provide experiences for the students to understand better the given situation or the conditions in a given problem. This is followed by the practice of discussing possible problems for study. and recognizing specific problems in situations. however, these were only "occasionally"" practised by the Science teachers.

Provision of activities related to picking out and defining key words, becoming aware of exact meanings of word groups, and discussing possible problems for study are the first three concerns of the English teachers. These were "often" practised by them. Defining key words and knowing the exact meaning of words are necessary for better understanding of the given problem. This is also expected to be the focus of English teachers. The other sub-skills were "occasionally" practised by the teachers.

For the Mathematics teachers, discussing possible problems for study was the most attended to. This is followed by sensing situation involving problem and becoming aware of exact meanings of word groups. However, these were not practised by the teachers to a great extent. They only "occasionally" provide the students experiences to help develop these skills. In Mathematics, problem solving is usually the focus but how can the students solve a problem if they are not given opportunities, as frequent as possible, in understanding what they are trying to solve. They should always be given opportunities to develop students' skills in defining a problem.

The Makabayan teachers are believed to have "occasionally" practised the nine sub-skills geared towards developing skills in sensing and defining a problem. Based on the mean ratings, discussing possible problems for study was rated the highest.

The teaching practice least attended to by all the teachers. which is conducting personal interviews, is a manifestation that the teacher-respondents do not often give their students experiences to interact with others and ask questions that will lead them to classify a given problem.

Teaching Practices Related to Skills in Collecting Evidence on Problems. Perceptions on activities employed by the teacher-respondents to develop students skills in collecting evidence on problems are presented in Table 4. There are ten sub-skills included in this category.

Table 4. Mean ratings showing the extent of thinking skills practices of secondary school teachers in Ilocos Sur along collecting evidence on problems.

SUB-SKILLS	SCIENCE TEACHERS		ENGLISH TEACHERS		MATH TEACHERS		MAKABAYAN TEACHERS		AS A WHOLE	
	X pp	Rank	X DR		X DR	Rank	X DR	Rank	X DR	Rank
1. Using a wide range of information sources	318 Occ	2	3.32 Occ	4	3.19 Occ	2	2.76 Occ	4	3.11 Occ	4
2. Developing skills in using references	3.26 Occ		3.48 Of	2	3.14 Oc.	3	2.87 Ccc	3	3.20 Occ	
3. Developing skills on note taking	3.17 Occ	3	3.58 Of		3.05 Occ	4	2.70 Occ	6	3.13 Occ	3
4. Developing skills on using reading aids in books	3.01 Occ	5	331 O	5	2.97 Occ	5	3.02 Occ		3.08 Oc	5
5. Evaluating information	3.06 Occ	4	3.47 Of	3	3.22 Occ		301 Occ	2	3.19 Occ	2
6. Using lab demonstrations tor collecting evidence	2.60 Se	9	1.91 Se	9	2.64 Occ	6	2.23 Se	9	2.35 Se	9
7. Using controlled experiments for collecting evidences	2.80 Occ	7	1.90 Se	10	2.57 Se	8	2.01 Se	10	2.32 Se	10
8. Developing skills in interviewing	253 Se	10	2.70 Occ	6	245 Se	9	235 Se	7	2.51 Se	3
9. Using community resources	2.74 Occ	8	2.52 Se	7.5	2.32 Se	10	2.74 Occ	5	2.58 Se	6.5
10. Using visual aids	2.87 Occ	6	2.52 Se	7.5	2.58 Se		2.33 Se	8	2.58 Se	6.5
Overall	2.93 Occ		2.87 Occ		2.81 Occ		2.60 Se		2.80 Occ	

As a whole, the teacher-respondents "occasionally" provide experiences to help develop students' skill in collecting evidence on problems (I=2.80). The four groups of teacher-respondents also practised this skill "occasionally" except the Makabayan teachers who were believed to have "seldon" practised such a skill.

Generally, developing skills in using references was rated the highest which was "occasionally" practised by the leachers. On the other hand, using controlled experiments for collecting evidences was rated the lowest which was "scldom" practised by the teacher-respondents. This is expected because experimentation is not usually practised by all the teachers.

Among the Science teachers, developing skills in using references was the most attended to, followed by using a wide range of informaton sources. These were nly practised "occasionally" by the teachers. It is believed that these are done to tram students in gathering varied information necessary to solve a problem.

However. further scrutiny of the table reveals that using controlled experiments and laboratory demonstrations for collecting evidences are not the primary concerns of the Science teachers. The use of laboratory demonstrations was even "seldom" practised by the teachers. With the nature of science, it is expected that experimentation and laboratory demonstrations are the main sources of evidences in solving a problem. This is, therefore, a manifestation that the Science teachers seldom provide hands-on or laboratory activities to their students. This could be due to the lack of knowledge of the teachers on what laboratory activities they are to give,to their students, lack of exposure of the teacher to carry out an experiment, and lack of laboratory equipment and facilities of the school. In the absence of standard laboratory equipment, community resources should be utilized. However, skills in using community resources was "occasionally" practised by the teachers.

Developing skills in interviewing was the least attended to by the Science teachers. This indicates that the teachers seldom provide their students with experiences in gathering evidences through personal interviews. This is also a manifestation that collecting evidences to solve a problem is confined to what are in non-human information sources like printed and non-printed materials.

The English teachers "often" provide activities that help develop skills in note taking. using references, and evaluating information with the first sub-skill as the most attended to. In English classes. a lot of reading and writing activities are usually done. Hence. the skill of note taking is usually being developed. Using controlled experiments for collecting evidences was the least attended skill by the teachers. This is expected because experimentation is not usually emphasized by the English teachers as a method of collecting evidences to solve a problem.

Evaluating information was rated highest among the Mathematics teachers. However, this skill was only "occasionally" practised by them. This could have been practised by the teachers to a greater extent. In Mathematics. this skill includes identifying what are given and how the given information are related. The table further shows that using community resources. as a way of collecting evidences to solve a problem, was the least attended to by the Mathematics teachers. This was "seldom" practised together with the use of visual aids. The blackboard is usually used by the teachers as their visual aid.

For the Makabayan teachers, developing the skill of using reading aids in books was rated highest but only "occasionally"' practised. Using controlled experiments for collecting evidences was the least attended sub-skill. This is expected because of the nature of the subjcct.

Teaching Practices Related to Skills in Organizing Evidence on Problems. Organizing is a skill used to arrange information so it can be understood or presented more effectively. In this skill, structure on information and

experience like matching. similarities, noting differences, or indicating sequences must be imposed. There are six specific skills under this category. These are presented in Table 5.

Table 5. Mean ratings showing the extent of thinking skills practices of secondary school teachers in Ilocos Sur along organizing evidence on problems.

SUB-SKILLS	SCIENCE TEACHERS		ENGLISH TEACHERS		MATH TEACHERS		MAKABAYAN TEACHERS		ASA WHOLE	
	X DR	Rank	X OR	Rank	X OR	Rank	X OR	Rank	X OR	Rank
1. Developing skills in arranging data	3.24 Occ		3.05 Occ	3	3.02 Occ	3	2.54 Se	4	2.96 Occ	3
2. Developing skills in making graphs	2.65 Occ	6	2.77 Occ	6	3.12 Occ		2.40 Se	6	2 74 Occ	6
3, Using deductive reasoning	271 Occ	4.5	287 Occ	5	303 Occ	2	2.51 Se	5	2.78 Occ	5
4. Summarizing data	312 Occ	2	3.37 Occ	2	2.96 Occ	4	2.78 Occ		3.06 Occ	
5. Distinguishing relevant from irrelevant facts	2.77 Occ	4.5	3.04 Occ	4	2.68 Occ	6	2.67 Occ	3	2.79 Occ	4
6. Making outlines	2.91 Occ	3	3.50 Of		2.93 Oc	5	2.70 Occ	2	3.01 Occ	2
Overall	**2.90** Occ		**3.10** Occ		**2.95** Occ		**2.60** Se		**2.89** Oc	

Based on the computed mean, the teacher-respondents, as a whole and by group are viewed as "occasionally" providing activities to develop the skills or organizing evidence on problems except the Makabayan teachers who are claimed as "seldom" practicing this skill. Generally, the teacher-respondents "occasionally" practice all the six sub-skills. By sub-skill, skills in summarizing data was rated the highest while developing skills in making graphs, the lowest.

By group of respondents, the science teachers gave more attention to activities that develop students' skills in arranging data. This is related to sequencing entities according *to* given criterion. This implies that these teachers let their students look for attributes as a means to develop readiness for ordering and provide them opportunities *to* arrauge ideas or concepts.

Providing experiences for students to use deductive reasoning which is a very important skill needed in Science was not practised to a greater extent. From among the sub-skills. this is only rank **4.5.** The skill least attended to by the Science teachers is developing skills in making graphs. This skill should also be given emphasis in science classes because it is through a graph where relationships of ideas or concepts are best illustrated. Likewise. Science teachers should require their students to construct graphs out of a data gathered as basis in solving problem.

Providing activities to help develop skills in making outlines was the most attended to by the English teachers. In composition writing, which is one of the concerns of the English teachers, making outlines of ideas is necessary. Among the sub-skills of organizing, developing skills in making graphs was the least attended to by these teachers.

In contrast, the Mathematics teachers give more emphasis in providing experiences to help develop skills in making graphs. This is related to the skill of representing. This skill refers to changing existing knowledge structures to incorporate new information. The main forms used are visual, verbal and symbolic.

Along with this skill, the Mathematics teachers let their students represent data in graphs or charts. On the other hand, activities that require students to distinguish relevant from irrelevant facts, were least attended to by the teachers. This should also be practised by the Mathematics teachers to a great extent. This is related to the skill of comparing where the students identify similarities and differences between or among entities. Finding similarities help students organize both new and known information by establishing how things may be related. Precision. discrimination and judgment are involved in this skill.

} The Makabayan teachers are believed as "occasionally" giving experiences hhat help develop skills in summarizing data, making outlines, and distinguishing relevant from irrelevant facts with the first skill as most attended to. However. they "seldom" develop skiils in arranging data. making graphs and using deductive reasoning with making graphs, the least attended to.

Teaching Practices Related to Skills in Interpreting Evidence on Prohlems. A description of the teaching practices of the teacher-respondents related to interpreting evidence along with the five sub-skills are exhibited in Table 6.

There was a consistent extent of practice of the teachers, as a whole and by group according the subject they teach. The perceived mean ratings indicate that the teacher-respondents "occasionally"" give activities that help improve students' skills in interpreting and analyzing gathered information by examining parts and relationships. The function of analysis is to "look inside" ideas. It is the core of critical thinking. Hence. this should be practised most of the time.

Table 6. Mean ratings showing the extent of thinking skills practices of secondary school teachers in Ilocos Sur along interpreting evidence on problems.

SUB-SKILLS	SCIENCE TEACHERS		ENGLISH TEACHERS		MATH TEACHERS		MAKABAYAN TEACHERS		AS A WHOLE	
	X DR	Rank	X DR	Rank	X DR	Rank	X DR	Rank	X DR	Rank
1. Selecting important ideas	3.47 Of		3.82 Of		3.47 Of		3.34 Occ		3.53 Of	
2. Identifying relationships	3.12 Occ	2	3.07 Occ	3	3.21 Occ	2	2.98 Occ	2	3.10 Oc	2
3. Seeing consistencies/ weaknesses in data	2.95 Occ	3.5	3.04 Occ	d	2.97 Occ	4	2.38 Se	4	2.84 Oc	4
4. Slating relationship as generalizations	2.95 Oc	3.5	2.99 Occ	5	3.17 Occ	3	2.66 Occ	3	2.94 Occ	3
5. Assessing statements	2.80 Occ	5	3.10 Occ	2	2.80 Occ	5	2.30 Se	5	2.75 Occ	5
Overall	3.06 Occ		3.20 Occ		3.12 Occ		2.73 Occ		3.03 Occ	

Looking further at the entries m the table reveals that the four groups of teachers give more attention to activities that help develop skills in selecting important ideas. This was "often" practised by the teachers except those teaching Makabayan who are believed to be practicing this skill "occasionally". Selecting important ideas includes identifying the central elements, that is, the hierarchy of key ideas in a message or line of reasoning. Hence, this is good teaching practice of the teachers. Identifying relationships was also attended to by the teachers. This is a manifestation that the teachers occasionally ask students to identify the specific type of relationship such as equality, inequality and the like; they provide means for students to find patterns and relationships

Teaching Practices Related to Skills in Selecting and Testing Hypothesis. Table 7 shows the practices of the teacher-respondents along the development of skills in selecting and testing hypothesis. There are six sub-skills considered under the skill.

Table 7. Mean ratings showing the extent of thinking skills practices of secondary school teachers in Ilocos Sur along selecting and testing hypothesis.

SELECTING AND TESTING HYPOTHESIS	SCIENCE TEACHERS		ENGLISH TEACHERS		MATH TEACHERS		MAKABAYAN TEACHERS		AS A WHOLE	
	X DR	Rank	X DR	Rank	X DR	Rank	X DR	Rank	X DR	Rank
1. Judging significance, pertmnency of dala	2.93 Occ	4	2.91 Occ	2	2.98 Occ	2	2.61 Occ	3	2.86 Occ	3
2 Checking hypotheses with authorities	2.73 Occ	6	2.87 Occ	3.5	2.78 Occ	4	2.45 Se	4	2.7 Occ	4
3. Inferring from [acts/observations	3.04 Occ	2	2.87 Occ	3.5	2.97 Occ	3	2.94 Occ		2.96 Occ	2
4. Devising controlled experiments (or testing hypotheses	3.01 Occ	3	2.09 Se	6	2.70 Occ	5	2.21 Se	6	2.50 Se	6
5. Recognizing! formulating assumptions	2.82 Occ	5	2.72 Occ	5	2.57 Se	6	2.36 Se	5	262 Occ	5
6 Rechecking data for errors	3.24 Occ		3.11 Occ		3.24 Occ		2.62 Occ	2	3.05 Occ	
Overall	2.96 Occ		2.76 Occ		2.87 Occ		2.53 Se		2.78 Occ	

In general, the teacher-respondents have average level of proficiency in displaying skills in selecting and testing hypothesis. This is based on their occasional practice of providing experiences to help students develop this particular skill (X=2.78).

In particular, rechecking data for errors was rated the highest, as a whole and by the Science, English and Mathematics teachers. However, the mean ratings for the activity that allows students to check data for errors suggests that this was only practised "occasionally" by the teachers. This indicates that the Science, English and Mathematics teachers occasionally provide opportunities for students to recognize errors and fallacies in various learning contexts; identify causes of errors; and correct errors in solutions.

The Makabayan teachers. on the other hand. give particular attention to activities related to inferring from facts/observations. This suggests that they occasionally let students generate hypotheses as new information is provided; and ask students to make conjectures based on a series of activities.

Providing activities that help students develop skills in devising controlled experiments for testing hypotheses was the least concem of the teacher-respondents, as a whole, but this was the number 3 concern of the Science teachers.

Teaching Practices Related to Skills in Formulating Conclusions. The perceived skills in fonnulating conclusions by the teacher-respondents are displayed in Table 8. Specifically, the table describes how the teachers provide activities on formulating, evaluating and applying conclusions.

Table 8. Mean ratings showing the extent of thinking skills practices of secondary school teachers in Ilocos Sur along formulating conclusions.

SUB-SKILLS	SCIENCE TEACHERS		ENGLISH TEACHERS		MATH TEACHERS		MAKABAYAN TEACHERS		AS A WHOLE	
	X DR	Rank	X DR	Rank	X DR	Rank	X DR	Rank	X DR	Rank
1. Formulating conclusions	3.65 Of		3.56 Of		3.40 Occ		292 Occ		3.38 Occ	
2. Evaluating conclusions	3.43 Of	3	3.40 Occ	3	3.15 Occ	3	2.85 Occ	2	3.21 Occ	3
3. Applying conclusions	3.44 Of	2	3.44 Of	2	3.33 Occ	2	271 Occ	3	3.23 Occ	Z
Overall	**3.50** Of		3.47 Or		**3.29** Occ		**2.83** Occ		3.27 **Occ**	

As can be gleaned from the table, the teacher-respondents. as **a** whole and by the Mathematics and Makabayan teachers are perceived as occasionally providing activities for students to formulate conclusions. But it is believed that the Science and English teachers "often" practice this skill. However, development of this skills is the number one concer of the teachers, as a whole and by group. Evaluating conclusions was their least concern.

Teaching Practices Related to Evaluating Skills. Evaluating skills involve assessing the reasonableness of ideas. Under this skill are collecting, organizing and interpreting evidences. Table 9 describes the extent of practice of the teacher-respondents along the development of these skills.

Table 9. Mean ratings showing the extent of thinking skills practices of secondary school teachers in Ilocos Sur along evaluating.

SUb–SKILLS	SCIENCE TEACHERS		ENGLISH TEACHERS		MATH TEACHERS		MAKABAYAN TEACHERS		ASA WHOLE	
	X DR	Rank	X DR	Rank	X DR	Rank	X DR	Rank	X DR	Rank
1. Collecting evidence	3.22 Occ		3.01 Occ	2	3.00 Occ		2.73 Occ	2	299 Occ	
2. Organizing evidence	3.11 Occ	2	2.98 Oc	3	269 Occ	2.5	2.65 Occ	3	2.86 Occ	2
3. Interpreting evidence	292 Occ	3	3.04 Occ		2.69 Occ	25	2.74 Occ		2.85 Occ	3
Overall	3.09 Occ		3.01 Occ		2.79 Occ		2.71 Occ		2.90 Occ	

The table manifests that the teachers, as a whole and by group, are considered "occasionally" providing activities for the development of evaluating skills. This is based on the obtained mean ratings.

Collecting evidence as a sub-skill was the most attended to by the teacher-respondents, as a whole and by the Science and Mathematics teachers. Interpreting evidence was the most attended skill by the English and Makabayan teachers. however, this was least attended to by the teacher-respondents as a whole.

Summary of the Thinking Skills Practices of Secondary School Teachers in Ilocos Sur

The summary of the teachers' thinking skills practices as assessed by themselves and their students is reflected in Table 10.

Table 10. Mean ratings and ranking of the thinking skills practices of the secondary school teachers in Ilocos Sur.

THINKING SKILLS	MEAN	DESCRIPTIVE RATING	RANK
Developing Foundations of Reasoning	2.94	Occasional	4
Sensing and Defining a Problem	3.11	Occasional	2
Collecting Evidence on Problems	2.74	Occasional	6
Organizing Evidence on Problems	2.83	Occasional	5
Interpreting Evidence on Problems	2.50	Seldom	8
Selecting and Testing Hypothesis	2.99	Occasional	3
Formulating Conclusions	3.62	Often	I
Evaluating	2.73	Occasional	7
Overall	**2.65**	**Average**	

As gleaned from the table, the combined mean ratings of the teacher-respondents and their students reveal that the secondary school teachers in Ilocos Sur have an average level of thinking skills practices. They provide activities to their students in the following order. formulating conclusions, sensing and defining a problem, selecting and testing hypothesis, developing foundations of reasoning, organizing evidence on problems, collecting evidence on problems, evaluating, and interpreting evidence on problems. This suggests that of all the skills included in the study, skills in formulating conclusions were the most often.attended to while skills in interpreting evidence on problems were the least attended to. Furthermore, this means that the teachers are most adept with skill in formulating conclusions because it is the skill which they often practice.

Based on the mean ratings obtained for each of the skills, it can be inferred that the secondary school teachers in Ilocos Sur view themselves .and by their students as average thinkers and, therefore are not much proficient to teach these skills especially skill in interpreting evidence on problems the fact that they seldom practice this skill. They are not yet much capable in planning activities that would enhance the development of such thinking skills. In effect, the thinking skills of the students have no been developed. This is so because the teachers could have not provided activities that would develop their thinking skills. Because of this, it is suggested that the secondary school teachers in Jlocos Sur should receive explicit instruction on thinking skills in order to excellently transfer the same skills to their students. Otherwise, the development of critically thinking students would not be realized.

Relationship Between Extent of Thinking Skills Practices and **Personal/Professional Factors**

In order to determine the relationship between the respondents extent of practice of thinking skills and personal/professional characteristics such as age, sex, educational attainment and years of teaching experience, data was statistically analyzed through Simple linear Correlation Analysis. Results of the analysis are presented in Table 11.

There are no significant relationships between the teachers' extent of practice of thinking skills and age, sex, educational attainment and years of teaching experience. The computed correlation coefficients failed to attain significance at 0.05 probability level. The above findings indicate that the frequency of practice of providing activities to help develop students' thinking skills is not related to the teachers' age, sex, educational attainment. and years of teaching experience.

Table 1I. Correlation coefficients showing the relationship between teachers' thinking skills practices and personal/professional factors.

THINKING SKILLS	PERSONAL/PROFESSIONAL FACTORS			
	AGE	SEX	EDUCATIONAL ATTAINMENT	YEARS OF TEACHING EXPERIENCE
Developing Foundations of Reasoning	.097	.091	.112	.111
Sensing and Defining a Problem	.123	.056	.103	.I IO
Collecting Evidence on Problems	.061	.035	.061	.076
Organizing Evidence on Problems	.130	.049	.053	.021
Interpreting Evidence on Problems	.009	.081	.141	.039
Selecting and Testing Hypothesis	.107	.036	179»	.124
Fonnulating Conclusions	.063	.123	*.055*	.057
Evaluating	.076	.116	.131	.061
Overall	.085	.073	.089	.016

However by skill, the table shows that it is only between extent of practice of skills in selecting and testing hypothesis and educational attainment that obtained significant relationship ($p<.05$). This means that finishing graduate units can contribute in helping teachers practice more often the skill of selecting and testing hypothesis.

Conclusions

The following conclusions are drawn out of the study:

1. Most of the teacher-respondents are in their middle age, female, with master's units, and considered as experienced teachers.
2. The secondary school teachers in Ilocos Sur are average thinkers. Skills in formulating conclusions were the most often attended to while skills in interpreting evidence on problems were the least attended to by the

teachers. They are not much proficient to teach these skills especially skill in interpreting evidence on problems the fact that they seldom practice this skill. They are not yet much capable in planning activities that would enhance the development of such thinking skills. They could not yet fully provide activities that would develop students' thinking skills.

3. Teachers' extent of practice of thinking skills is not related to their personal/professional characteristics such as age, sex, educational attainment, and years of teaching experience. By skill, educational attainment is related to teachers' practice of selecting and testing hypothesis.

Recommendations

Based from the results of this study the following actions are recommended.

1. Secondary school teachers in Ilocos Sur should advance themselves professionally by taking up graduate studies in line with their field of specialization.
2. The existing general and professional education courses for teachers in all subjects should be reviewed to provide wider application of thinking skills. It should be revised or enriched to accommodate mstruction of thinking skills.
3. Training for teachers should be conducted with focus on teaching for higher order thinking skills. Likewise, schools should conduct echo-seminars for teachers who can not be sent to attend trainings outside the school.
4. School administrators should constantly monitor and evaluate classes. They should also see to it that there is proper application in classroom what teachers learn from trainings.
5. A research should be conducted to determine the teachers understanding of the core thinking skills: and the teaching strategies they think can be best utilized to teach thinking skills to the students.

References

BEYER, B. K. 1997. *Improving Student Thinking – A Comprehensive Approach.* Needham **MA**: Allyn and Bacon.

BLAGG, N., et al.. 1988. *Foundations for Problem Solving.* Somerset Thinkmg Skills Course Handbook. Oxford: Basil Blackwell Ltd.

DEWEY, J. A. 1968. *Quotable Quotes* in *Education.* Detroit: Wayne State University Press.

GILHOOLY, R.J. 1982. *Thinking: Directed, Undirected and Creative.* London: Academic Press.

GLASER, R. 1984. *Education and Thinking: The Role of Knowledge.* American. Psychologists.

HERNANDEZ, D. F. 1991 *Developing and Assessing Higher Order Thinking Skills.* Monograph 46, ISMED, University of the Philippines. December.

MARZANO, R. and ARRENDODO, D. 1986. *Tactics for Thinking: Trainer's Manual.* Colorado: Mid-Continent Regional Educational Laboratory.

PIAGET, J. *The Development of Thought: Equilibrium of Cognitive Structures (translated by Arnold Rosin).* New York: The Viking Press, 1977.

PRESSEISEN, B. Z. 1988. *Avoiding Battle at Curriculum Gulch: Teaching Thinking and Content.* Educational Leadership, 45.

SUHOR, C. 1984. *"Thinking Skills in English – and Across the Curriculum.* ERIC Digest." ERIC Document Reproduction Service.