

THE INTELLECTUALIZED FILIPINO OF A SAMPLE OF TERTIARY SCIENCE STUDENTS

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1. INTRODUCTION

1.1. Background of the Study

In 1974, the Bilingual Education Policy promulgated that beginning in grade one in Tagalog speaking areas all subjects should be taught in Filipino except English communication arts, mathematics, science, which should be taught in English. By 1981, the Policy should have been implemented in all high schools and by the end of 1983-84 graduates of colleges and universities were supposed to have been tested in Filipino in the courses they had specialized in.

However, in the early part of Policy implementation, teachers encountered many problems and one problem commonly reported was the lack of textbooks written in Filipino (Gonzalez 1988). Further, a number of teachers handling mathematics and science explicitly stated their need for reorientation from English to Filipino. In response, the Department of Education, Culture and Sports spearheaded a continuing training/education program for teachers. Colleges and universities sponsored workshops and seminars on the teaching of Filipino and the teaching of the content courses in Filipino. At the same time, materials development projects were similarly encouraged so that, for example, at De La Salle University, a group of professors in the mathematics department embarked on a number of materials development (Acelajado et al. 1991-92, Aldaba, 1993-94, Garcia and Acelejado 1995-96) and research projects (Acelejado 1992-93).

In 1994, at De La Salle University-Manila, teachers were given the freedom to choose their medium of instruction in the teaching of major courses. The mathematics department experimented having some classes taught in Filipino and initial reports claimed that students who had enrolled in mathematics where Filipino was the medium of instruction fared better than those in the English medium class. Another attempt at the College of Science was to teach chemistry in Filipino and students claimed better understanding of the lessons even though all scientific terms were in English. Although the experiment ran for only a term, the students concerned seemed to have benefited more from the instruction delivered in Filipino.

A number of studies have been reported and written about the Filipino learner (Maminta 1991, Coronel 1990, Acuña 1987, Mercado-Surot 1987, Ilagan 1985, Lingan 1981) in their attempt to discover the mental development of students in their use of Filipino. Similarly, there have been some attempts on materials development in the use of Filipino in learning computers (De Castro 1997), in investment mathematics (Aldaba 1993-94), in college algebra (Acelajado, Aldaba, Dela Rosa and others 1991-92), in the development of a dictionary in mathematics (Garcia and Acelejado 1996); however, only this study has focussed on finding out the functional use of Filipino in content courses that are traditionally taught in English. Earlier, Montañano conducted studies involving two levels -

grade school (Montañano 1993) and high school (Montañano 1996) on the topic of the intellectualization of Filipino.

1.2. Theoretical/Conceptual Framework

Cummins (1983, 1984, 1991; Cummins and Swain 1986) has proposed that language learners have two independent levels of proficiency, namely, Basic Interpersonal Communication Skills (BICS) and Cognitive Academic Language Proficiency (CALP).

BICS is the construct of language proficiency in the language used during face-to-face interaction. It is a “surface fluency” (Cummins 1983, 1984, 1991; Cummins and Swain 1986) manifested in everyday communicative contexts. CALP, on the other hand, is the deeper component of language competence closely related to logical reasoning. It refers to skills beneath the linguistic facade that are cognitively more demanding. Thus, CALP is the language used in academic settings.

For social interaction, BICS requires a speaker to have some skills such as knowledge about something that needs to be talked about, comprehension skills to be able to interpret messages coming from a speaker, application skills for listener/speaker to interact and to give feedback to the speaker/listener. In academic settings, CALP requires skills such as analysis in order for listeners to break down the constituent parts of a message, then to determine their connection and recognize the organizational principles that hold the whole communication together. Then, the listener in some instances communicates this message (s/he now turns into a speaker/communicator) but would wish to effect a specific response. In so doing, s/he uses a particular form and convention to organize these ideas coupled with her/his own experiences. The product or outcome is called a synthesis. On the other hand, evaluation in academic settings goes beyond those quick decisions more rightfully termed opinions. Being considered in the academic setting is the evaluative skill based on a relatively adequate comprehension and analysis of something to be appraised.

The skills equated with BICS and CALP have been categorized into lower and higher level cognitive skills in the educational taxonomy by Bloom (1956). Those at the lower level include knowledge, comprehension, and application while those at the higher level are analysis, synthesis, and evaluation.

For this present study as well as in the two earlier ones (1993, 1996), the lower order cognitive skills were conceptualized as part of the search for the highest/strongest cognitive skills in cognitive/academic language proficiency. Figure 1 below tries to capture the concept of CALP in Filipino.

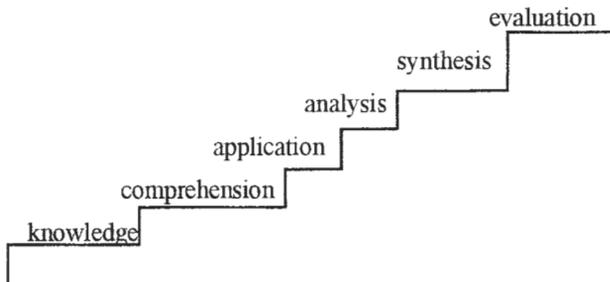


Figure 1: Levels of CALP

1.3. Research Objectives

This study intended to find the CALP (cognitive/academic language proficiency) level of students in the use of Filipino. Specifically, this present study aimed to identify at which cognitive skill the students at the tertiary level were highest (strongest) in the use of Filipino. Likewise, it sought to identify the cognitive skill at which the present sample was lowest (weakest) in the range of Bloom's taxonomy.

1.4. Significance of the Study

This study will significantly establish the baseline of the present sample as regards the taxonomy of cognitive skills proposed by Bloom (1956). More importantly, this sequel will be able to generate data about CALP and identify the level of the students' CALP in Filipino — the language used in academic settings, the language competence closely related to logical reasoning.

The sequencing of the study since its initial conception has aimed to monitor indirectly the development of the cognitive skills of the sample population in the use of the Filipino language in an academic setting, i.e. the use of Filipino in content subjects and not in Filipino Communication Arts. It is good to point out at this juncture that the 1993 population sample (elementary pupils) must have been enrolled in secondary school when the second study (1996) was conducted. At the time of writing, this 1993 population sample must already be pursuing their degree in college. It should be made clear that what is referred to here is the general population and not necessarily the same sample used in the 1993 nor in the 1996 study. Nonetheless, this study will add to the already existing body of data on the CALP level in Filipino pioneered by this researcher and is a contribution to the increasing literature on the intellectualization of Filipino.

2. METHODOLOGY

This simple descriptive study involved a sample group of students in the College of Science. The subjects of the present study fall in the age range of 17 to 18 years of age. Being native speakers they all possess high basic interpersonal communication skills in Filipino, meaning to say that they can communicate with accuracy and style. They are able to effectively maintain their own part in a discussion where they either initiate, maintain, or elaborate as necessary. As native speakers, they have the ability to respond to attitudinal changes in the course of communication and reveal humor where and when needed.

This study began with the development of a test instrument (Montañano 1993b) funded by the University Research Coordination Office (URCO) of De La Salle University. That project aimed to construct a test intended for the tertiary level that could assess the functional language proficiency of students in Filipino. The test duplicated the instrument done for the grade school and high school (Montañano 1991).

The test (Montañano 1993b) was composed of six parts matching the six cognitive skills as specified in Bloom (1956). First, the test underwent language validation by three Filipino language professors for the language level of difficulty; then it underwent content-validation by two professors, one who teaches mathematics and the other, Filipino language. Secondly, the test underwent a trial run, after which the Statistical Assistance for Research office (STAR) weeded out items based on the levels of difficulty and discrimination. Finally, STAR culled 100 items from the original 135. Thus, the final form of the test underwent item revision and refinement before the final run. The distribution is shown below.

Table 1: Validated CALP Test Item Distribution

Cognitive skills	Items
Knowledge	8
Comprehension	24
Application	23
Analysis	23
Synthesis	12
Evaluation	10
Total	100

The test was then administered to two sections of second year students in the College of Science. The sample was selected from those who intended to major either in mathematics or in other applied sciences, have started a course or two for majors, and have finished at least one course in Filipino. These criteria were employed to ensure that the sample would already have possessed a good understanding of the content and more importantly the use of the language. For the scoring, a point was given for each correct answer; subsequently, the mean was derived for each section of the test.

3. RESULTS AND DISCUSSION

The results showing the mean averages of the test are presented in Figure 2.

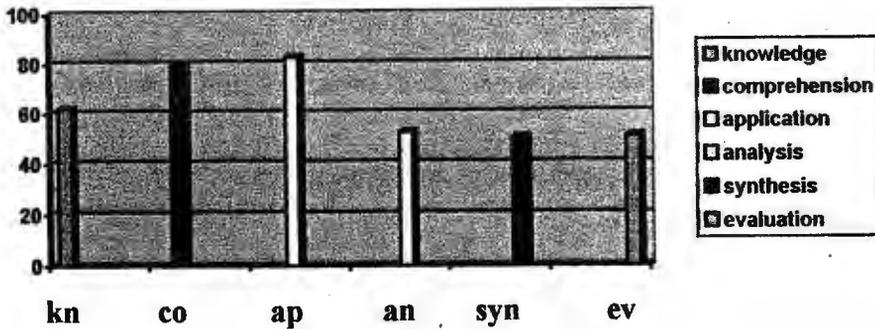


Figure 2: Mean of Test Results

3.1. Knowledge

For this segment of the test, the subjects showed a mean of 62.05% for remembering a lot of information. It can be said that the recall ability of the present sample was moderately high. A test of knowledge is usually a test of memory, of accuracy of recall, be it words, phrases, or statements in response to particular questions. The mean shows that the sample has a lot of knowledge which could be interpreted as valuable because it was used in a test situation, so different from the way knowledge was used first in the classroom. Test

situations are different from classroom learning situations in the sense that students go through the simultaneous mental process of relating to test questions and of judging which option best fits as answer.

The mean score shows that the subjects are good at remembering, considered a major psychological process in learning. Regardless of time lapse and the wording of the questions, the students readily recalled information. In other words, the sample is proficient in the recall of specifics.

The use of two books (Acelajado et al. 1991-92 and Aldaba 1993-94) might have contributed to the development of this skill. These two URCO-funded projects aimed to build the mathematical vocabulary in Filipino. On the other hand, the *Diksyunaryong Filipino-Ingles, Ingles-Filipino ng mga Katawagang Pangmatematika* (Garcia and Acelajado 1995-96), although its contribution as regards topic or subject matter was indirect, might have given more than sufficient means of enriching students' knowledge of specifics in the field of mathematics. Hence, these projects might have helped toward improving the capacity, adequacy, and effectiveness of the Filipino vocabulary as medium of instruction for mathematics.

However, their mean score was slightly lower than that of the high school group (1996) by .78 (refer to Appendix A/A1). Since the intended population was the science group, the test items for the college students seemed to have a concentration on the recall of specifics on mathematics and the sciences while those for the high school had a broader base such as social studies, geography, and history. Not to be set aside is the fact that these courses in the social sciences are taught in Filipino in grade school and high school while the natural sciences are taught in English. So, the mental processing, storing, recalling could be different if one is done in the mother tongue and the other in another language.

3.2. Comprehension

The mean average of 79% indicated the students' good ability to grasp the thought of any given written discourse in Filipino. It means that students have gone beyond the simple processing part by part of materials written in Filipino. In other words, not only do they see but they also understand the complex relationships of these parts. In an academic setting, these students have gone beyond simply stringing together vocabulary words in Filipino.

The score was similarly indicative of the sample's ability in the comprehension process that entails three sub-skills, namely translation, interpretation, and extrapolation. Translation means the ability to translate relationships expressed in one form (e.g. non-verbal) to another (verbal) or vice-versa; interpretation goes beyond merely repeating or rephrasing what has been given, and extrapolation covers subskills such as predictions or inferences.

The 79% mean could also be a manifestation of the students' bilingual ability, that is, the ability to process two languages effectively. Help might have come from the dictionary containing the mathematics terms found in their original English translation in Filipino and vice-versa (Acelajado and Garcia 1995-96), the book on college algebra in Filipino (*Pangkolehiyong Aldebra*) developed by Acelajado, Aldaba, De La Rosa, and others (1991-92), where they also aimed at adding new mathematical terms in the language to enrich the Filipino vocabulary of scientific terms. It is necessary to point out that classroom lectures in other science courses are delivered in English, while the instrument used in this project was in Filipino. With the input in English and the output in Filipino, the result indicated the college students' good competence in Filipino, possessing the ability to translate understanding from one language (English) to another (Filipino). Such mental processing is indicative of a competent bilingual.

Nonetheless, for this group specific recall of knowledge proved more difficult than translating relationships from one form to another or interpreting the givens in the test situation. The present result likewise confirms Maminta's (1991) findings regarding the linguistic interdependence of English and Filipino which specifically points to a high degree of transfer of skills that occurs from L2 to L1 and vice versa.

3.3. Application

As many teachers would say, if a student truly comprehends something, then s/he can apply it. In the test, the students must have been able to apply learned behavior because application was highest (82.60%) among the six cognitive skills. The respondents showed a very distinct attainment of application, evidence that there occurred a transfer of skills from comprehension to application. The mean gain of 3.44%, though slim, seemed to confirm that the "taxonomy is arranged in a certain hierarchy where comprehension is a prerequisite to application; where the latter demands skills and abilities of its lower order skills in order for it to be used fully" (Bloom 1956:120).

The test results showed a very distinct difference in the functional language proficiency of the subjects. Against Cummins' framework on the thresholds of language proficiency, the subjects' cognitive/academic language proficiency is at the level of application. More than that, it seems to say that the subjects have the skills and abilities to understand Filipino and use the language to carry over into the given situations in the test. Application is the skill where these students are strongest.

The use by students of the experimental edition of the investment book by Aldaba (1993) *Matematiks ng Pamumuhunan* (Mathematics of Investment in Filipino: INVESMA) could have been instrumental in the development of the application skill among them. The book deals with teaching mathematical concepts in Filipino and presents in four chapters topics such as *simpleng interes*, *kompawnd na interes*, *mga anyuwiti*, and *amortisasyon*. The discussion in Filipino contains varied examples where students were expected to apply the principles discussed after each chapter; thus, this could have helped establish the place of Filipino in an academic environment such as De La Salle University. The students might have developed a proper attitude toward the use of Filipino and are probably no longer shy to equate it with English as an academic language on campus. Thinking in Filipino and solving problems using the Filipino language have indeed taken root at the tertiary level.

The results also suggest that the curricular offering on campus is effective as shown by how well the students were able to carry over into the test situations applications they never faced in the learning process. They indicate that training can be transferred to new areas if the students are taught in such a way that they learn good methods of solving problems rather than simply learning concepts and generalizations.

A seeming parallelism runs across the other two academic levels, those of the grade school and high school (refer to Appendix A/A1). There is an increasing trend of gained mean percentage from knowledge to comprehension to application proving Bloom's statement quoted above.

3.4. Analysis

The mean percentage was 52.17% for analysis. The skill of analysis is a "prelude" to the higher order cognitive skill of synthesis; hence, it should not be surprising that the result fell to 52.17% given the fact that the skills in analysis are at a more advanced level than those of comprehension and application. In communication, analysis involves three subskills: identification or classification of elements of communication, establishing

relationships among the elements, and recognition of some organizational principles or the arrangement and structure that holds the whole communication. Thus, Bloom (1956) contends that analysis is the first among the higher order cognitive skills that deals with both the content and form of a communication.

The connection between knowledge and analysis seems very evident in this case (to recall, knowledge averaged 62.05%). Where analysis of a communication appeared to be insufficient or worst, deficient, basic knowledge of some subject matter would therefore be inadequate. For example, the low percentage may indicate that students could still be lacking in the ability to recognize unstated assumptions or to distinguish factual from normative statements.

The sample appeared weak in analysis where the language to use for processing is Filipino. This could mean that the students were weak in breaking down information using Filipino. Students most probably used the English language more than Filipino in much analytic work in the mathematics and science courses. That this is the case is understandable since the language of instruction is mainly English. Some teachers admitted to code-switching during lectures but that was very minimal. They claimed that code-switching was normally resorted to in cases where they wanted to emphasize a point that could not be readily understood by the students using a certain medium of instruction. Others claimed intentional code-switching for some sociolinguistic reasons such as establishing rapport with the students. Teachers observed that students seemed not to reject outright concepts that appeared complex whenever code-switching was used.

Acelajado (1994-95) in her study about the relative effects of Filipino and English as media of instruction in college algebra on students' achievement revealed that the students who were taught College Algebra in English achieved better than those who were taught in Filipino. The respondents of the experimental group (Filipino medium group) obtained mean ratings lower than those of the control group (English group) in Quiz 1 (Algebraic Expressions, Special Products, and Factoring), Quiz 2 (Exponents, Fractions, and Radicals), Quiz 4 (Functions, Systems of Equations, Matrices and Determinants), and in the midterm and final examinations and consequently, received a lower final grade in college algebra. It was only in Quiz 3 (Linear Equations, Quadratic Equations and Inequalities) that the experimental group had a higher mean rating than the control group. Her research findings indicated that the respondents still favored English as the medium of instruction in College Algebra.

The subskills in analysis, according to Bloom (1956), develop from difficult to more difficult to even more complex and difficult such as those illustrative of organizational principles. These involve ability to discern the purpose, point of view, attitude contained in a communication and, in particular instances, classroom lectures. However, it should be pointed out here that one limitation of the test instrument used in this study was that there were not enough items to cover each objective under the subskills in analysis.

The skill of analysis is one of the weakest by the grade school group (refer to Appendix A/A1). Even though the mean percentage in analysis by the high school group was slightly lower (1.16%) than that in application, it was found out that the higher order cognitive skill had been reached in high school.

3.5. Synthesis

This part of the test got a mean average of 50.0%. To recall, synthesis is the cognitive skill that requires a learner to work with the givens and combine these in such a way that the end-product is something new, a newness that was not clearly presented before.

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This is the lowest mean average in the six-part test, meaning that the students are weakest in the skill of synthesis. The results suggest that the present sample is weak in verbal synthesis, that is, they are weak in the use of Filipino in the process of thinking up something new.

The 1996 study indicated that the higher cognitive skills in Filipino were reached at third year, reconfirming the earlier findings (Montañano 1993) that synthesis is the most difficult higher order cognitive skill. This means to say synthesis has indeed a wider magnitude in tasks because it involves comprehension, application, and analysis. Even though these three skills are involved in the construction of meanings, they tend to be more partial compared with synthesis (Bloom 1956).

It is very surprising that the present subjects are low in the skill of synthesis since the 1996 sample showed that the higher cognitive skills have already been reached at that stage. However, it should be remembered that the 1996 sample came from homogeneously grouped students in high socio-economic status schools while the present sample, although at the tertiary level, is heterogeneously grouped and comes from different types of secondary schools.

Similarly, there were more items such as mathematical computation (number ability) that needed to be answered verbally in Filipino. In mental/internal processing, these two functions are located in different areas of the brain. In other words, the subjects had to use different parts of the brain to compute, and to supply the words of the answer. That is the reason why synthesis is the most complex cognitive skill. It needs comprehension in order to interpret what is being asked for in a question and analysis in order to find the solution. In synthesis, students are made to draw from a lot of sources and to put these together into one whole new structure. The end result of a synthesis is something new, in the sense that it is more than the materials they began working with.

Synthesis is a thinking skill in which one has to gather stock knowledge or past experiences with the information at hand in order to come up with something new. This is creativity. DLSU students do not lack creativity as manifested by a big number of creative outputs in their extra-curricular activities or student organizations on campus. Thus, the low result in synthesis is a fact that has to be explained.

For this researcher, synthesis is a form or an act of creativity. However, there is a prevailing feeling that creativity has always been associated by a majority of our students with curricular enrichment or for activities outside formal studies inside the classroom. In other words, creativity seems to have been equated more with social activities and not with formal learning outputs.

Not only is this skill the lowest by the tertiary group (see Figure 2) but it is similarly the lowest in mean percentage of both the grade school and high school groups (refer to Appendix). It appears therefore that this is indeed the most difficult skill for the three academic levels in the functional use of Filipino.

3.6. Evaluation

For the last skill in this domain, the mean percentage was 50.6, very close to the mean averages of analysis and synthesis. The low mean averages of the three higher cognitive skills do tell us our students' weaknesses in their functional use of Filipino.

Bloom (1956) states that evaluation involves a combination of other skills (knowledge, comprehension, application, analysis, synthesis); hence, if one is not efficient in evaluation, then, he/she is weak. The whole range of cognitive skills can be compared to a long chain where each ring represents a skill. If one is not fully secured, then the chain breaks. Security

depends on the strength of each link and the same goes for evaluation. If skills previous to it are not well established or well honed, then, evaluation is weak.

Evaluation is natural to humans. Whatever comes within purview gets to be evaluated, judged, appraised, assessed, or valued. It is surprising therefore that evaluation got a low mean percentage. This phenomenon can be explained by a cultural aspect where Filipinos by nature are not vocal about judging and/or avoid being critical of situations confronting them by simply keeping quiet or by not even thinking about them.

The result could also suggest that these students made a shift to English in the higher cognitive skill. There is a psycholinguistic term called "mother-in-law" language described as a speaker's shift to another language, either L2 or FL, to address another in order for a third party not to understand conversational exchanges. This shift occurs whenever critical things are being discussed or evaluated.

Another possible explanation is that the test was a multiple choice type. For a testee to arrive at an evaluation of a situation where the choices are given, he/she has to do a number of mental/cognitive processing activities of the whole test situation. This is where the claim of Bloom proves to be true regarding the skills involved in evaluation. Evaluation does not simply entail dishing out opinions but rather involves decisions preceded by careful consideration of the various aspects of what is being assessed. Under Bloom's categories, evaluation can be made on the basis of either internal and external standards of criticism. Examples of micro skills for internal evidence are the ability to assess accuracy in reporting facts and the ability to apply given criteria to the evaluation of the work. External evaluation requires the ability to compare with the highest known standards and skill in recognizing and weighing values involved in alternative courses of action. In other words, evaluation entails a long process.

3.7. Implications of the Present Findings

Consistent among the three groups (Montañano 1993, 1996, 1999) is the students' weakness in synthesis (refer to Appendix A for comparative results of the three studies). To recall, synthesis is that skill which makes students draw upon elements of many sources. The end result of this process is for students to bring about a product which was not there before.

The three studies are also consistent in the students' strongest skill, which is comprehension. Even though a higher order skill was reached at the high school level, the sample used in that study was a select group of students belonging to the honor sections of high socioeconomic status schools. The present sample, despite the fact that they are now enrolled in a high socio-economic status school, did not parallel the secondary school group.

The higher order cognitive skills showed a much lower mean than the lower order cognitive skills. It could be surmised that the present sample may be resorting to thinking in English in order to solve a problem. It must be pointed out that the medium of instruction for a number of courses at the tertiary level is still English. Courses such as philosophy, which involves a high level of thinking, are handled in English. It was also learned that some major courses of this sample are handled by English-speaking professors such as two Americans, one Vietnamese, and one Sinhalese. Ninety percent (90%) of the teaching faculty in the College of Science have trained in universities abroad and that being the case, they teach and think in English. Furthermore, as was pointed out to this researcher, all their lives these students have been studying science in English. These may explain why the thinking skills of the present sample are not manifested in Filipino.

Synthesis is the cognitive ability of putting together communicative elements and parts so as to arrive at a whole communication form. It proceeds through an internal/mental

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processing of working with elements and parts, then combining these in such a way as to produce a structure that was not there before. Therefore, the cognitive skill of synthesis emphasizes personal expression as against passive participation, and independence of thought and action as against dependence.

The findings could also indicate that the sample from the tertiary level must have been overexposed to a lot of authoritative teachers who probably had a very limited time for classroom interaction except for graded recitation where most questions require memory work. This is not saying that memory should not play a role in classroom interaction. We recognize its significance; however, what we are saying is for teachers to adopt classroom teaching interaction that will strike a balance between the real and the ideal such as the following:

Table 4: Types of Classroom Interaction

Responding	Sociating	Organizing	Directing	Presenting	Evaluating	Eliciting
40%	05%	10%	0%	10%	05%	30%

From Malamah-Thomas 1987:56.

The present researcher similarly admits the role of teacher power (Montañano 1998) in any given classroom interaction. The present findings imply that the sample in its study recognizes the expert power of their teachers most especially in their field of specialization. Expert power (Bryans and Cronin 1984) stems from the teachers having the knowledge and skill (in the content or major courses) which their students definitely do not as yet possess. This acclaimed role of the teacher could have a stunting effect on the development of the students' synthesizing skills because they would simply resort to memorizing the lectures of their professors whom they admire for their expertise.

Teachers at all levels are encouraged to recognize and capitalize on other forms of teacher power in the classroom. This researcher found out that personal power is likely to encourage students' independent thinking if used maximally in classroom teaching (Montañano 1998). Hence, teachers are enjoined to use their personal power (similar to Weber's charismatic authority) to influence and motivate students into thinking for themselves. It might be through this type of power that students' independence of thought and action will be developed. In so doing, classrooms will democratize the process of learning where students are able to arrive at their own decisions rather than having someone in authority do the thinking for them. The result is personal expression, an end product of synthesizing skills.

4. CONCLUSIONS AND RECOMMENDATIONS

For this group of students, the functional language proficiency in the use of Filipino has reached the level of application. In other words, the CALP level for this sample group is at application, where they are highest in the use of Filipino in the cognitive skills. They are confident using Filipino at this level of cognitive processing. On the other hand, the lowest mean percentage is at synthesis, which indicates the weakest skill of this sample in the use of Filipino in their thinking process.

It would be advantageous to conduct further studies of a similar nature in order to validate the findings. First would be to replicate this study to include more sections in the

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College of Science in order to arrive at more conclusive evidence regarding Filipino CALP at the tertiary level. Similarly, it would be beneficial to expand this research vertically, meaning, to go into the graduate students' CALP. In so doing, data would be more complete — from grade school through high school and college and finally to graduate school.

Another research project that can be looked into is a correlational study between the functional language proficiency of students and their academic achievement in other courses where the medium of instruction is Filipino.

Subsequent research such as a parallel study on the use of cognitive skills in English and a comparative analysis of the two sets of results (those of the present research and those of the one in English) would also be interesting to look into. This type of study if and when undertaken will shed more light on students' cognitive ability to use Filipino to learn other subject matter.

More important is to develop a test similar to the instrument used in this study but with more items under each subskill. Then, there would be more ease in identifying the specific skill at which students are strongest and weakest.

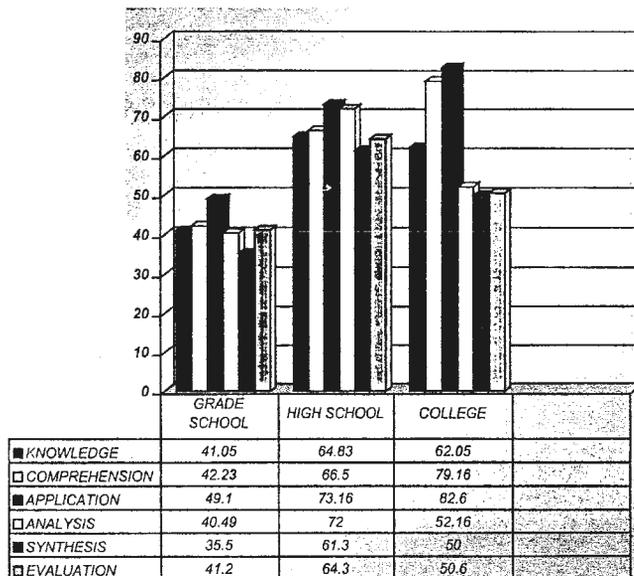
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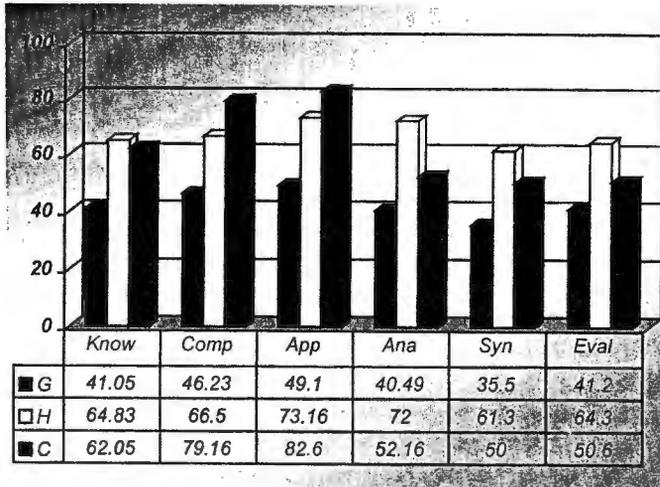
APPENDIX A

RESULTS OF THE 1993, 1996, 1999 STUDIES



APPENDIX A1

RESULTS OF 1993, 1996, 1999 STUDIES



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